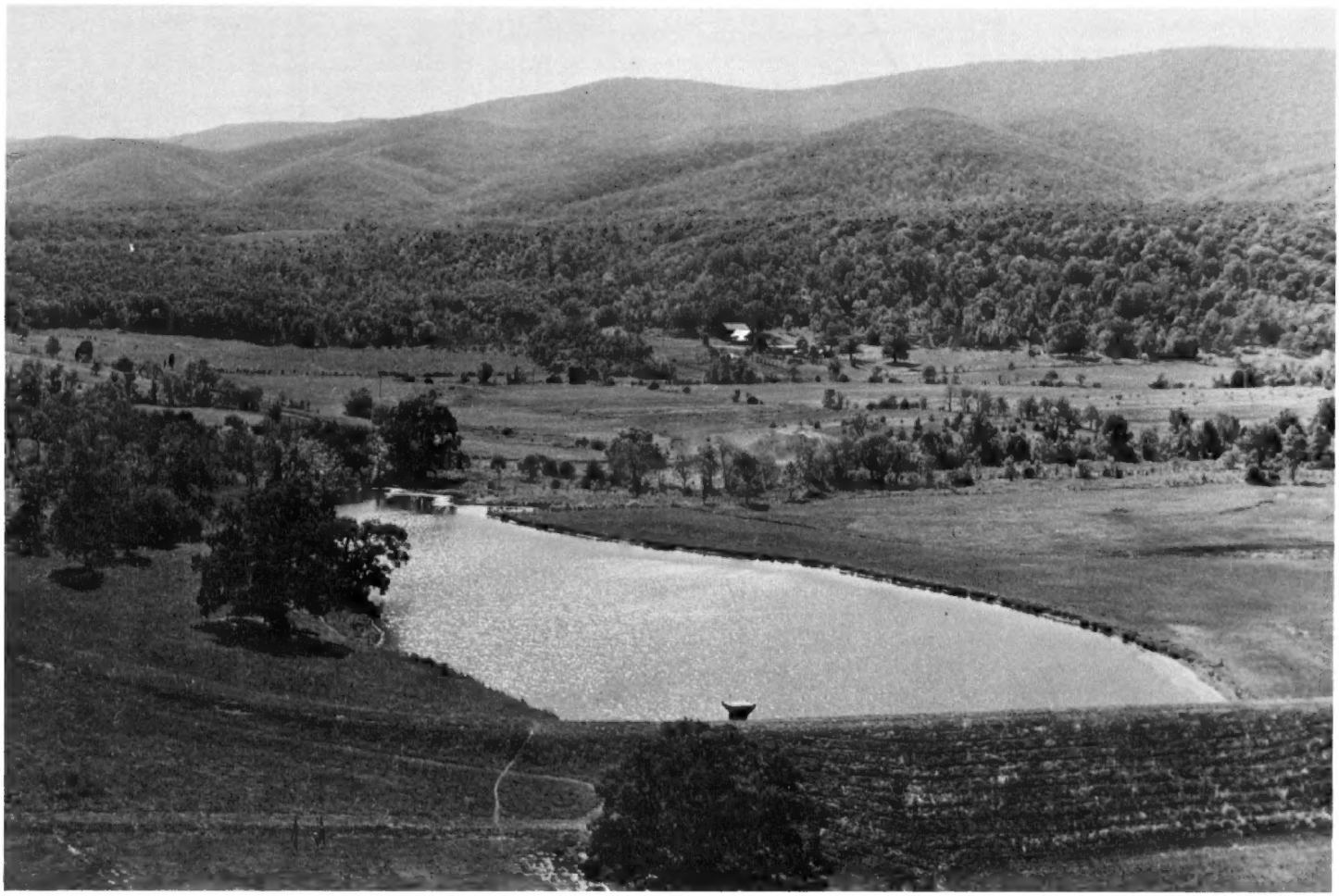
SOIL SURVEY OF

Hampshire, Mineral, and Morgan Counties,

West Virginia



United States Department of Agriculture
Soil Conservation Service
In cooperation with
West Virginia University
Agricultural Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1960–70. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1972. This survey was made cooperatively by the Soil Conservation Service and the West Virginia University Agricultural Experiment Station. It is part of the technical assistance furnished to the Potomac Valley and Eastern Panhandle Soil Conservation Districts.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Hampshire, Mineral, and Morgan Counties are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classifications of each. It also shows the page where each soil is described and the page for the woodland suitability subclass in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those that have a moderate limitation can be colored yellow, and those that are severely limited can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units.

Foresters and others can refer to the section "Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for dwellings, industrial buildings, and for recreation areas in the section "Town and Country Planning."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation, Morphology, and Classification of the Soils."

Newcomers to Hampshire, Mineral, and Morgan Counties may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the counties given in the section "General Nature of the Survey Area."

Cover: Large cleared area of a gently sloping Laidig channery loam in foreground. Lehew-Berks and Lehew-Dekalb complexes in background. Area of a Berks shaly silt loam on the left of the flood-prevention structure, which protects the New Creek Valley.

Contents

Issued February 1978

SOIL SURVEY OF HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA

BY WILLIAM H. CURRY, SOIL CONSERVATION SERVICE

FIELDWORK BY ROBERT A. BECKER, WILLIAM H. CURRY, FRANK A. DOONAN, DAVID E. McKINNEY, AND ROY E. PYLE, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, IN COOPERATION WITH WEST VIRGINIA UNIVERSITY AGRICULTURAL EXPERIMENT STATION

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES are in the northeastern part of West Virginia (fig. 1). The three counties have a combined area of 769,280 acres, or 1,202 square miles. In 1970 they had a combined population of 59,125.

Hampshire County has an area of 408,960 acres, or 639 square miles; Mineral County, to the west, has 211,200 acres, or 330 square miles; and easternmost Morgan County has 149,120 acres, or 233 square miles.

About 74 percent of the survey area is woodland, 12 percent is pasture, 9 percent is cropland, and 5 percent is water and other areas. The Forest Service manages about 2,645 acres of the George Washington National Forest in the Hampshire County part. In 1969, Hampshire County had 601 farms on 172,254 acres. Harvested cropland was 20,463 acres. Mineral County had 340 farms on 94,552 acres. Harvested cropland was 10,434 acres. Morgan County had 202 farms on 35,576 acres. Harvested cropland was 6,334 acres.

This three-county area is one of the better areas for farming in the State. The growing season ranges from about 100 days at higher elevations to about 165 days at lower elevations.

Precipitation generally ranges from 32 inches annually in the Romney area to 35 inches in eastern Morgan County, but in western Mineral County 50 inches falls annually on the Appalachian Plateau.

About 40 percent of the survey area is in farms. Principal sources of farm income are orchard fruits, beef cattle, poultry, and dairy products.

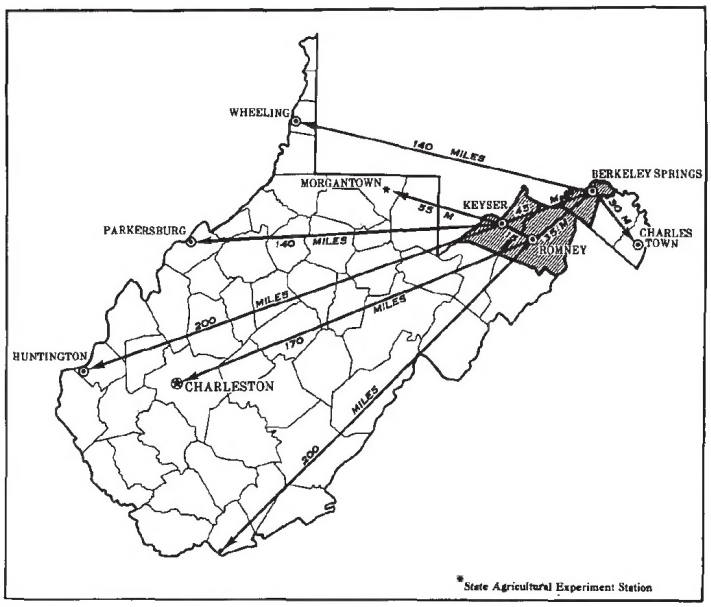


Figure 1.—Location of Hampshire, Mineral, and Morgan Counties in West Virginia.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Hampshire, Mineral, and Morgan Counties, where they are located, and how they can be used. The soil scientists went into the counties knowing they were likely to find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many characteristics of the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil

series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Berks and Weikert, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Berks channery silt loam, 8 to 15 percent slopes, is one of several phases within the Berks series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Hampshire, Mineral, and Morgan Counties: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Lehew-Berks complex is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. Dekalb and Lehew very stony sandy loams is an undifferentiated group in this survey area.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Rubble land is a land type in this survey area.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants, and as material, foundations, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or its high water table. They see that streets, road pavements, and foundations for houses are cracked on a certain kind of soil, and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Hampshire, Mineral, and Morgan Counties. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one less extensive soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in an area, who want to compare different parts of the survey area, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in Hampshire, Mineral, and Morgan Counties are discussed in the following pages.

Soil association names and delineations on the general soil map do not fully agree with those on the general soil map of adjacent counties published at a different date. Differences in the maps are the result of

improvement in the classification of soils, particularly modifications or refinements in soil series concepts. In addition, more precise and detailed maps are needed because the number of users of the maps and the need for detail have increased in recent years. The more modern maps meet these needs. Still another difference is the pattern of occurrence of the major soils or the range in slope that is permitted within associations in different surveys.

1. Gilpin-Wharton-Ernest association

Moderately deep and deep, well drained and moderately well drained soils that formed in acid material weathered from shale, siltstone, and sandstone; on uplands and foot slopes of the Allegheny Plateau

This association is on a broad plateau in the southwestern part of Mineral County. It is drained by streams flowing into the North Branch Potomac River. The soils are mainly gently sloping to moderately steep, but they are commonly steep or very steep where they occur along the bluffs that face the river and in areas above major drainageways.

This association makes up about 5 percent of the survey area. It is about 56 percent Gilpin soils, 9 percent Wharton soils, 8 percent Ernest soils, and 27 percent less extensive soils.

Gilpin soils are moderately deep and well drained. They formed in material on uplands. These soils have a dark-brown and grayish-brown, medium-textured surface layer and a yellowish-brown, medium-textured and moderately fine textured subsoil that is shaly in the lower part. In some areas the surface is extremely stony.

Wharton soils are deep and moderately well drained. They are on benches and flats on uplands. These soils formed in material weathered from shale and siltstone and commonly have seams of coal. They have a brown, medium-textured surface layer and a yellowish-brown and strong-brown, moderately fine textured subsoil that becomes light gray and shaly with depth. They have a seasonal high water table and a slowly permeable subsoil. In some areas the surface is very stony.

Ernest soils are deep and moderately well drained. They are on foot slopes. These soils formed in acid material that moved downslope from soils that are underlain by shale, siltstone, and sandstone. They have a dark yellowish-brown, brown, and grayish-brown, medium-textured and moderately fine textured subsoil that is shaly and mottled in the lower part. They have a moderately slowly permeable fragipan in the lower part of the subsoil. They have a seasonal high water table. In some areas the surface is very stony.

Less extensive in the association are Pope, Philo, and Atkins soils on narrow flood plains; Andover, Brinkerton, Laidig, and Buchanan soils on foot slopes; and Dekalb soils and areas of Strip mine on uplands (fig. 2).

Most of this association is wooded. Lumber and pulpwood are the main wood products. There are few full-time farmers, but several residents supplement their income by raising beef cattle and sheep. Areas of this association on Allegheny Front Mountain provide good habitat for many species of wildlife. These areas are used for hunting. Slope, permeability, depth to bedrock, depth to seasonal high water table, and stoniness are limitations to the use of this association for homesites, septic tank absorption fields, and roads and streets.

2. Dekalb-Lehew-Calvin association

Moderately deep, well-drained soils that formed in acid material weathered from sandstone, siltstone, and shale; on uplands along the east slope of Allegheny Front Mountain

This association is on mountain slopes and a few benches and flats in southwestern Mineral County. In places the association is dissected by drainageways that form ridges that have northeast and southwest aspects. The soils are mainly steep and very steep, but where they occur on benches and flats they commonly are moderately steep and strongly sloping.

This association makes up about 2 percent of the survey area. It is about 32 percent Dekalb soils, 24 percent Lehew soils, 17 percent Calvin soils, and 27 percent less extensive soils.

Dekalb soils have a very dark grayish-brown and yellowish-brown, moderately coarse textured surface layer and a yellowish-brown, channery, moderately coarse textured subsoil. They have a very stony or flaggy surface.

Lehew soils have a dark-gray and reddish-brown, channery, moderately coarse textured surface layer and a reddish-brown, channery, moderately coarse textured subsoil. They have a very stony or flaggy surface.

Calvin soils have a reddish-brown, channery, medium-textured surface layer and a reddish-brown, channery and very channery, medium-textured subsoil. In some areas these soils have an extremely stony surface. The bedrock contains thin layers of limy shale and limestone.

Less extensive in the association are Laidig and Buchanan soils on foot slopes and Ramsey soils, Typic Dystrochrepts, stony, and areas of Rubble land on uplands.

Most of this association is wooded. Lumber and pulpwood are the main wood products. Almost all the cleared areas are on less sloping Calvin soils on benches; they are used mainly for pasture. Small areas near the sparse homesteads are cultivated, and crops are grown for home consumption. This association is a popular hunting area. The abundant food, cover, and springs provide good habitat for many species of wildlife. Slope, depth to bedrock, and stoniness are limitations to use of this association for homesites, septic tank absorption fields, and roads and streets.

3. Berks-Weikert association

Shallow and moderately deep, well-drained soils that formed in acid material weathered from shale, siltstone, and sandstone; on foothills of the Ridge and Valley Region

This association is on low rolling foothills and lower mountain slopes throughout the three counties. The soils are mainly gently sloping to very steep.

This association makes up about 45 percent of the survey area. It is about 53 percent Berks soils, 32

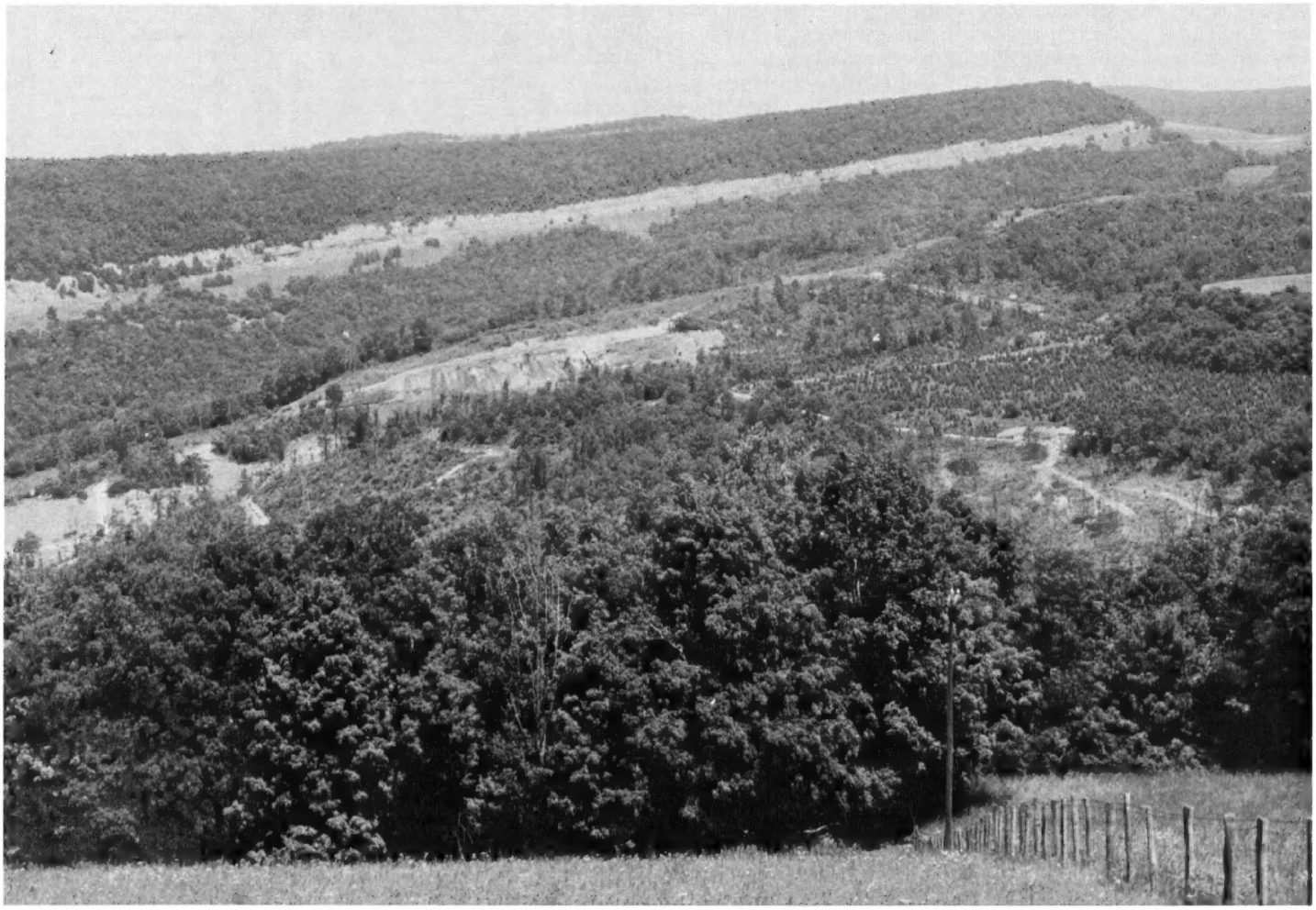


Figure 2.—**Strip mines in the Gilpin-Wharton-Ernest association.**

percent Weikert soils, and 15 percent less extensive soils.

Berks soils are moderately deep. They have a very dark brown and dark-brown, channery, medium-textured surface layer and a yellowish-brown, channery and very channery, medium-textured subsoil.

Weikert soils are shallow. They have a dark-brown, shaly, medium-textured surface layer and a yellowish-brown, very shaly, medium-textured subsoil.

Less extensive in the association are Pope, Philo, and Atkins soils on narrow flood plains; Ernest, Brinkerton, Laidig, and Buchanan soils on foot slopes; Allegheny, Monongahela, and Tygart soils on terraces; and Dekalb, Lehew, and Edom soils on uplands.

The gently sloping to moderately steep soils are used mainly for pasture and hay, and the steeper soils are mainly wooded. Many formerly cultivated fields have reverted to Virginia pine. The soils in this association are droughty, and more than half are severely eroded. Raising beef cattle is the main farm enterprise. Hunting clubs, game preserves, and private hunting and fishing camps are common. Areas along State Routes 522 and 9 in Morgan County have been developed for homesites and motels and other tourist accommodations. Slope and limited depth to bedrock are limitations to use of this association for homesites, septic tank absorption fields, and roads and streets.

4. Lehew-Berks-Dekalb association

Moderately deep, well-drained soils that formed in acid material weathered from sandstone, siltstone, and shale; on rolling hills and mountains of the Ridge and Valley Region

This association is on low rolling hills and mountains in Hampshire and Morgan counties. The soils are mainly strongly sloping to very steep.

This association makes up about 17 percent of the survey area. It is about 47 percent Lehew soils, 38 percent Berks soils, 4 percent Dekalb soils, and 11 percent less extensive soils.

Lehew soils have a dark-gray and reddish-brown, channery, moderately coarse textured surface layer and a reddish-brown, channery, moderately coarse textured subsoil. In some areas the surface layer is very stony or flaggy.

Berks soils have a very dark brown and dark-brown,

channery, medium-textured surface layer and a yellowish-brown, channery and very channery, medium-textured subsoil.

Dekalb soils have a very dark grayish-brown and yellowish-brown, moderately coarse textured surface layer and a yellowish-brown, channery, moderately coarse textured subsoil. The surface layer is very stony or flaggy.

Less extensive in the association are Pope, Philo, and Atkins soils on flood plains; Laidig, Albrights, Buchanan, Andover, Ernest, Brinkerton, and Murrill variant soils on foot slopes; and Weikert and Calvin soils, areas of Rubble land, and areas of the Lithic Udorthents-Rock outcrop complex on uplands.

Areas of the gently sloping, strongly sloping, and moderately steep, nonstony soils are generally cleared and are used mainly for pasture and hay. Orchards are common. The steeper areas and the very stony areas are droughty and are mainly wooded. Raising beef cattle and general farming are the main farm enterprises. Several of the farms are used as summer and weekend homes by people living in metropolitan areas. Hunting and fishing camps are common along the major streams of the association. Steepness of slope and limited depth to bedrock are limitations to use of this association for homesites, septic tank absorption fields, and roads and streets.

5. Dekalb-Lehew-Schaffenaker association

Moderately deep, well-drained, mostly very stony soils that formed in acid material weathered mainly from sandstone and from some siltstone and shale; on the more rugged ridges of the Ridge and Valley Region

This association is on ridges in eastern Hampshire County and in Morgan County. The soils are mainly steep and very steep and are very stony.

This association makes up about 13 percent of the survey area. It is about 28 percent Dekalb soils, 27 percent Lehew soils, 14 percent Schaffenaker soils, and 31 percent less extensive soils.

Dekalb soils formed in material weathered mainly from sandstone, but partly from siltstone and shale. They have a very dark grayish-brown and yellowish-brown, moderately coarse textured surface layer and a yellowish-brown, channery, moderately coarse textured subsoil.

Lehew soils formed in material weathered mainly from sandstone, but partly from siltstone and shale. They have a dark-gray and reddish-brown, channery, moderately coarse textured subsoil.

Schaffenaker soils are very stony soils that formed in material weathered from sandstone. They have a black and brown, coarse-textured surface layer and a yellowish-brown, coarse-textured subsoil.

Less extensive in the association are Andover, Brinkerton, Laidig, and Buchanan soils on foot slopes and Berks and Ramsey soils on uplands.

Most of this association is wooded. Lumber and pulpwood are the main wood products. This association is one of the major outdoor recreation areas in the survey area. It provides good habitat for many species of wildlife and is used for hunting. Hunting camps and clubs are common. Slope, limited depth to bedrock, and stoniness are limitations to use of this association for homesites, septic tank absorption fields, and roads and streets.

6. Elliber-Dekalb-Opequon association

Shallow to deep, well-drained soils that formed in acid and limy material weathered from cherty limestone and from sandstone and limestone; on ridgetops and slopes of the Ridge and Valley Region

This association is on the higher ridges and included mountain valleys in eastern Hampshire County and in Mineral County. The soils are mainly strongly sloping to very steep.

This association makes up about 7 percent of the survey area. It is about 23 percent Elliber soils, 19 percent Dekalb soils, 16 percent Opequon soils, and 42 percent less extensive soils.

Elliber soils are deep. They formed in acid material weathered from cherty limestone. They have a black and pale-brown, very cherty, medium-textured surface layer and a yellowish-brown, very cherty, medium-textured subsoil. In some areas the surface is very stony.

Dekalb soils are moderately deep. They formed in acid material weathered mainly from sandstone, but partly from siltstone and shale. They have a very dark grayish-brown and yellowish-brown, moderately coarse textured surface layer and a yellowish-brown, channery, moderately coarse textured subsoil. The surface in most areas is very stony.

Opequon soils are shallow and very rocky. They formed in limy material weathered from relatively pure limestone. They have a brown, moderately fine textured surface layer and a yellowish-red, fine-textured subsoil.

Less extensive in the association are Clarksburg, Laidig, Buchanan, Murrill, Andover, Brinkerton, and Murrill variant soils on foot slopes and Berks, Lehew, and Edom soils on uplands.

Areas of the strongly sloping and moderately steep soils are cleared and are used mainly for pasture and hay. Orchards and fruits are grown in parts of the association. Most of the steeper nonstony soils and the very stony soils are wooded. Raising beef cattle and general farming are the main farm enterprises. Wildlife is abundant. Hunting and fishing camps are common. Slope, limited depth to bedrock, stoniness, and rockiness are limitations to use of this association for homesites, septic tank absorption fields, and roads and streets.

7. Schaffenaker-Murrill-Opequon association

Shallow to deep, well-drained soils that formed in acid and limy material weathered from sandstone and limestone; on uplands and foot slopes of the Ridge and Valley Region

This association is on broad ridgetops, long benchy foot slopes, and some rolling hills in eastern Hampshire County and central Morgan County. The soils are mainly strongly sloping to very steep.

This association makes up about 6 percent of the survey area. It is about 19 percent Schaffenaker soils, 15 percent Murrill soils, 9 percent Opequon soils, and 57 percent less extensive soils.

Schaffenaker soils are moderately deep and very stony. They formed in acid material weathered from sandstone. They have a black and brown, coarse-textured surface layer and a yellowish-brown, coarse-textured subsoil.

Murrill soils are deep. They formed partly in acid colluvial material that moved downslope from soils underlain by sandstone, siltstone, and shale and partly in the underlying moderately fine textured to fine textured residuum weathered mainly from limestone. Murrill soils have a very dark gray and brown surface layer and a yellowish-brown, strong-brown, and yellowish-red subsoil, which is channery and medium textured in the upper part and fine textured in the lower part. In some areas the surface is very stony.

Opequon soils are shallow and very rocky. They formed in limy material weathered from relatively pure limestone. They have a brown, moderately fine textured surface layer and a yellowish-red, fine-textured subsoil.

Less extensive in the association are Laidig, Buchanan, Brinkerton, Clarksburg, and Murrill variant soils on foot slopes and Berks, Edom, Dekalb, and Lehew soils on uplands.

Most of the association is wooded. Farms are few and are scattered throughout the association. They are commonly owned by residents of metropolitan areas and operated as weekend or hobby farms. Wildlife is abundant. Hunting and fishing camps are common. Cacapon State Park is in this association.

Slope, limited depth to bedrock, stoniness, and rockiness are limitations to use of this association for homesites, septic tank drainage fields, and roads and streets.

8. *Pope-Monongahela-Tygart association*

Deep, well drained to somewhat poorly drained soils that formed in acid material; on flood plains and terraces of the Ridge and Valley Region

This association is on flood plains and terraces along New Creek, Patterson Creek, and North Branch Potomac River in Mineral County. The soils are mainly nearly level and gently sloping.

This association makes up about 2 percent of the survey area. It is about 23 percent Pope soils, 18 percent Monongahela soils, 10 percent Tygart soils, and 49 percent less extensive soils.

Pope soils are well drained and nearly level. They are on flood plains. Pope soils have a dark-brown and brown, moderately coarse textured surface layer and a dark yellowish-brown, moderately coarse textured subsoil. They are subject to flooding.

Monongahela soils are moderately well drained and nearly level to strongly sloping. They are on stream terraces. Monongahela soils have a dark-brown, medium-textured surface layer and a yellowish-brown and brown, medium-textured to moderately fine textured subsoil, which is mottled and is commonly gravelly in the lower part. They have a moderately slowly permeable fragipan in the lower part of the subsoil and a seasonal high water table.

Tygart soils are deep, somewhat poorly drained, and nearly level to gently sloping. They are on terraces. The medium-textured surface layer is brown, and the subsoil is brown, light yellowish brown, and light brownish gray. It is moderately fine textured to fine textured and is mottled. The soils have a slowly permeable subsoil and a seasonal high water table.

Less extensive in the association are Huntington, Chagrin, Lindside, Melvin, Philo, and Atkins soils and Fluvaquents and Udifluvents on flood plains; Allegheny and Braddock soils on terraces; Rushtown and Ernest soils on foot slopes; and Berks and Weikert soils, Typic Dystrochrepts, stony, and the Lithic Udorthents-Rock outcrop complex on uplands.

Most of the association is cleared, and the soils are used mainly for crops or hay. Raising beef cattle is the main farm enterprise, but a few dairy, truck, and poultry farms are in the association. The streams provide boating and fishing, and leased hunting and fishing camps provide additional income. Depth to seasonal high water table, permeability, and the hazard of flooding are limitations to use of this association for homesites, septic tank drainage fields, and roads and streets.

9. *Monongahela-Chagrin-Lindside association*

Deep, moderately well drained and well drained soils that formed in acid material on terraces and in lime-influenced material on flood plains of the Ridge and Valley Region

This association is on flood plains and terraces along the South Branch of the Potomac River and the Potomac River in Hampshire and Morgan Counties. The soils are mainly nearly level and gently sloping.

This association makes up about 3 percent of the survey area. It is about 27 percent Monongahela soils, 15 percent Chagrin soils, 10 percent Lindside soils, and 48 percent less extensive soils.

Monongahela soils are moderately well drained and nearly level to strongly sloping. They are on stream terraces. They formed in old acid alluvial material washed from soils on uplands underlain by sandstone, siltstone, and shale. Monongahela soils have a dark-brown, medium-textured surface layer and a yellowish-brown and brown, medium-textured to moderately fine textured subsoil, which is mottled and is commonly gravelly in the lower part. They have a moderately slowly permeable fragipan in the lower part of the subsoil and a seasonal high water table.

Chagrin soils are well drained and nearly level. They are on flood plains. They formed in alluvial material washed mainly from lime-influenced soils on uplands. They have a dark grayish-brown, moderately coarse textured surface layer and a dark-brown, medium-textured subsoil. They are subject to flooding.

Lindside soils are moderately well drained and nearly level. They are on flood plains. They formed in limy alluvial material washed from lime-influenced soils on uplands. Lindside soils have a dark grayish-brown, medium-textured surface layer and a dark-brown and yellowish-brown, medium-textured and moderately fine textured subsoil, which is mottled in the middle and lower parts. They have a seasonal high water table and are subject to flooding.

Less extensive in the association are Huntington, Melvin, Dunning, Pope, Philo, and Atkins soils Fluvaquents, and Udifluvents and Fluvaquents, very

gravelly, on flood plains; Allegheny, Tygart, and Purdy soils on terraces; Clarksburg, Ernest, Buchanan, Laidig, Andover, and Brinkerton soils on foot slopes, and Berks and Weikert soils and the Lithic Udorthents-Rock outcrop complex on uplands.

Most of the acreage is cleared, and the soils are used mainly for crops or hay. Raising beef cattle is the main farm enterprise, but a few dairy farms are in the association. The streams provide boating and fishing, and leased hunting and fishing camps provide additional income. Depth to seasonal high water table and the hazard of flooding are limitations to use of this association for homesites, septic tank absorption fields, and roads and streets.

Descriptions of the Soils

This section describes the soil series and mapping units in Hampshire, Mineral, and Morgan Counties. Each soil series is described in detail, and then, briefly, each mapping unit in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile; that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit. The description of each mapping unit contains suggestions on how the soil can be managed. Color terms are for moist soil unless otherwise stated.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Fluvaquents, for example, do not belong to a soil series but, nevertheless, are listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland suitability subclass in which the mapping unit has been placed.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*10*).[1]

[1] Italic numbers in parentheses refer to Literature Cited, p. 129.

Albrights Series

The Albrights series consists of deep, moderately well drained and somewhat poorly drained soils on foot slopes, mostly in central and western Hampshire County. The soils formed in acid colluvial material that moved downslope from soils that are underlain by red sandstone, siltstone, and shale. Slopes range from 3 to 15 percent.

In a representative profile the surface layer is dark reddish-brown silt loam about 7 inches thick. The subsoil is about 43 inches thick. The upper 6 inches is yellowish-red, friable heavy silt loam; the next 8 inches is yellowish-red, friable light clay loam mottled with pinkish gray and dark yellowish brown; and the lower part is a brittle fragipan that is yellowish-red, firm light clay loam mottled with reddish gray in the upper 13 inches and reddish-gray, very firm channery loam mottled with dark yellowish brown and dark red in the lower 16 inches. The substratum extends to a depth of 55 inches. It is reddish-gray very channery loam mottled with dark yellowish brown and dark red and is underlain by red sandstone and shale bedrock.

Permeability is moderately slow in the lower part of the subsoil and moderate in the upper part. Available water capacity is moderate to low. The seasonal high water table is at a depth of 1½ to 2½ feet. Fertility is low.

Albrights soils are suited to most crops commonly grown in the survey area. The fragipan restricts the development of roots and the movement of water through the soil. This may affect the growth of deep-rooted legumes such as alfalfa. About 50 percent of the acreage is wooded. Most cleared areas are in pasture. The seasonal high water table, moderately slow permeability, and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Albrights silt loam, 3 to 8 percent slopes, in a wooded area along a tributary of Graybill Hollow, 1.1 miles south-southeast of Points, in Hampshire County:

O1—½ inch to 0, partly decomposed pine needles.

Ap—0 to 7 inches, dark reddish-brown (5YR 3/4) silt loam; weak, fine, granular structure; friable; many roots; 10 percent coarse fragments; strongly acid; abrupt, smooth boundary.

B21t—7 to 13 inches, yellowish-red (5YR 5/6) heavy silt loam; weak, medium, subangular blocky structure; friable; many roots; few discontinuous clay films on faces of peds; 10 percent coarse fragments; strongly acid; clear, smooth boundary.

B22t—13 to 21 inches, yellowish-red (5YR 5/6) light clay loam; common, distinct, pinkish-gray (5YR 6/2) and dark yellowish-brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; friable; common roots; common discontinuous clay films on faces of peds and in pores; 10 percent coarse fragments; very strongly acid; clear, smooth boundary.

Bx1—21 to 34 inches, yellowish-red (5YR 5/6) light clay loam; many, medium, distinct, reddish-gray (5YR 5/2) mottles; weak, very coarse, prismatic structure parting to weak, medium, subangular blocky; firm, brittle, and slightly plastic; common discontinuous clay films on faces of prisms and in pores; 15 percent coarse fragments; very strongly acid; gradual, wavy boundary.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Hampshire County		Mineral County		Morgan County		Total acres	Total percentage of survey area
	Acres	Percent	Acres	Percent	Acres	Percent		
Albrights silt loam, 3 to 8 percent slopes	776	0.2	---	---	107	0.1	883	0.1
Albrights silt loam, 8 to 15 percent slopes	298	.1	179	0.1	29	(1)	506	.1
Allegheny fine sandy loam, 3 to 8 percent slopes	253	.1	252	.1	47	(1)	552	.1
Allegheny silt loam, 3 to 8 percent slopes	225	.1	203	.1	68	.1	496	.1
Allegheny silt loam, 8 to 15 percent slopes	154	(1)	187	.1	373	.3	714	.1
Andover and Brinkerton very stony soils, 3 to 8 percent slopes	612	.1	1,108	.5	58	(1)	1,778	.2
Atkins silt loam	2,548	.6	886	.4	1,272	.8	4,706	.6
Atkins silty clay loam	373	.1	134	.1	---	---	507	.1
Berks channery silt loam, 3 to 8 percent slopes	1,239	.3	61	(1)	1,117	.7	2,417	.3
Berks channery silt loam, 8 to 15 percent slopes	5,485	1.3	547	.3	2,790	1.9	8,822	1.2
Berks channery silt loam, 8 to 15 percent slopes, severely eroded	6,792	1.7	195	.1	2,939	2.0	9,926	1.3
Berks channery silt loam, 15 to 25 percent slopes	6,341	1.5	1,592	.8	3,706	2.5	11,639	1.5
Berks channery silt loam, 15 to 25 percent slopes, severely eroded	6,915	1.7	519	.2	4,163	2.8	11,597	1.5
Berks channery silt loam, 25 to 35 percent slopes	14,917	3.6	746	.4	5,743	3.8	21,406	2.8
Berks channery silt loam, 25 to 35 percent slopes, severely eroded	4,322	1.1	80	(1)	1,850	1.2	6,252	.8
Berks channery silt loam, 35 to 65 percent slopes	9,313	2.3	1,034	.5	5,093	3.4	15,440	2.0
Berks shaly silt loam, 3 to 8 percent slopes	749	.2	403	.2	54	(1)	1,206	.2
Berks shaly silt loam, 8 to 15 percent slopes	3,735	.9	3,828	1.8	254	.2	7,817	1.0
Berks shaly silt loam, 8 to 15 percent slopes, severely eroded	3,731	.9	1,975	.9	531	.4	6,237	.8
Berks shaly silt loam, 15 to 25 percent slopes	3,099	.8	4,807	2.3	371	.3	8,277	1.1
Berks shaly silt loam, 15 to 25 percent slopes, severely eroded	3,434	.8	4,258	2.0	227	.2	7,919	1.0
Berks shaly silt loam, 25 to 35 percent slopes, severely eroded	9,441	2.3	7,133	3.4	613	.4	17,187	2.2
Berks shaly silt loam, 35 to 65 percent slopes	2,846	.7	1,872	.9	2,336	1.6	7,054	.9
Braddock gravelly loam, 3 to 8 percent slopes	79	(1)	198	.1	155	.1	432	.1
Braddock gravelly loam, 8 to 15 percent slopes	108	(1)	214	.1	246	.2	568	.1
Brinkerton silt loam, 3 to 8 percent slopes	675	.2	735	.3	72	.1	1,482	.2
Buchanan channery loam, 3 to 8 percent slopes	1,256	.3	372	.2	288	.2	1,916	.2
Buchanan channery loam, 8 to 15 percent slopes	2,076	.5	1,062	.5	470	.3	3,608	.5
Buchanan very stony loam, 3 to 15 percent slopes	4,785	1.2	3,227	1.5	2,462	1.6	10,474	1.4
Buchanan very stony loam, 15 to 25 percent slopes	692	.2	3,505	1.7	74	.1	4,271	.6
Calvin silt loam, 15 to 25 percent slopes	---	---	329	.2	---	---	329	(1)
Calvin channery silt loam, 8 to 25 percent slopes	212	.1	---	---	136	.1	348	(1)
Calvin extremely stony silt loam, 35 to 65 percent slopes	---	---	2,566	1.2	---	---	2,566	.3
Chagrin fine sandy loam	3,046	.7	476	.2	1,353	.9	4,875	.6
Clarksburg channery silt loam, 3 to 8 percent slopes	2,718	.7	489	.2	94	.1	3,301	.4
Clarksburg channery silt loam, 8 to 15 percent slopes	1,190	.3	577	.3	58	(1)	1,825	.2
Clarksburg very stony silt loam, 3 to 15 percent slopes	1,603	.4	126	.1	8	(1)	1,737	.2
Clarksburg very stony silt loam, 15 to 25 percent slopes	805	.2	270	.1	---	---	1,075	.1
Dekalb and Lehew very stony sandy loams, 3 to 15 percent slopes	4,539	1.1	379	.2	1,722	1.1	6,640	.9
Dekalb and Lehew very stony sandy loams, 15 to 35 percent slopes	15,749	3.8	916	.4	4,453	3.0	21,118	2.6
Dekalb and Lehew very stony sandy loams, 35 to 65 percent slopes	18,220	4.4	5,605	2.7	20,287	13.6	44,112	5.7
Dunning silty clay loam	396	.1	194	.1	225	.2	815	.1
Edom silt loam, 8 to 15 percent slopes	385	.1	335	.2	17	(1)	737	.1
Edom silt loam, 15 to 25 percent slopes	401	.1	518	.2	152	.1	1,071	.1
Edom silt loam, 25 to 35 percent slopes	324	.1	496	.2	---	---	820	.1
Edom silty clay loam, 8 to 15 percent slopes, severely eroded	362	.1	46	(1)	---	---	408	.1
Edom silty clay loam, 15 to 25 percent slopes, severely eroded	251	.1	70	(1)	34	(1)	355	(1)
Edom silty clay loam, 25 to 65 percent slopes, severely eroded	1,035	.3	332	.2	157	.1	1,524	.2
Edom silt loam, moderately shallow variant, 8 to 15 percent slopes	249	.1	282	.1	19	(1)	550	.1
Edom silt loam, moderately shallow variant, 15 to 25 percent slopes	69	(1)	312	.1	---	---	381	(1)
Edom silt loam, moderately shallow variant, 25 to 35 percent slopes	308	.1	113	.1	210	.1	631	.1

TABLE 1.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Hampshire County		Mineral County		Morgan County		Total acres	Total percentage of survey area
	Acres	Percent	Acres	Percent	Acres	Percent		
Edom silty clay loam, moderately shallow variant, 8 to 15 percent slopes, severely eroded	196	(1)	251	0.1	---	--	447	0.1
Edom silty clay loam, moderately shallow variant, 15 to 25 percent slopes, severely eroded	260	0.1	120	.1	---	--	380	(1)
Elliber very cherty loam, 8 to 15 percent slopes	501	.1	216	.1	---	--	717	.1
Elliber very cherty loam, 15 to 25 percent slopes	462	.1	720	.3	---	--	1,182	.2
Elliber very cherty loam, 25 to 35 percent slopes	978	.2	2,304	1.1	---	--	3,282	.4
Elliber very stony loam, 15 to 35 percent slopes	600	.1	406	.2	14	(1)	1,020	.1
Elliber very stony loam, 35 to 65 percent slopes	2,382	.6	5,473	2.6	16	(1)	7,871	1.0
Ernest silt loam, 3 to 8 percent slopes	2,514	.6	1,033	.5	210	0.1	3,757	.5
Ernest silt loam, 8 to 15 percent slopes	1,905	.5	763	.4	417	.3	3,085	.4
Ernest very stony silt loam	---	--	2,020	1.0	---	--	2,020	.3
Fluvaquents	6,195	1.5	3,105	1.5	2,028	1.4	11,328	1.5
Gilpin silt loam, 3 to 8 percent slopes	---	--	554	.3	---	--	554	.1
Gilpin silt loam, 8 to 15 percent slopes	548	.1	837	.4	6	(1)	1,391	.2
Gilpin silt loam, 15 to 25 percent slopes	---	--	818	.4	---	--	818	.1
Gilpin silt loam, 25 to 35 percent slopes	---	--	728	.4	---	--	728	.1
Gilpin extremely stony silt loam, 3 to 15 percent slopes	---	--	3,482	1.7	--	.	3,482	.5
Gilpin extremely stony silt loam, 25 to 65 percent slopes	---	--	14,348	6.8	---	--	14,348	1.9
Huntington loam	324	.1	295	.1	54	(1)	673	.1
Laidig channery loam, 3 to 8 percent slopes	453	.1	194	.1	3	(1)	650	.1
Laidig channery loam, 8 to 15 percent slopes	1,244	.3	677	.3	48	(1)	1,969	.3
Laidig channery loam, 15 to 25 percent slopes	272	.1	284	.1	21	(1)	577	.1
Laidig very stony loam, 3 to 15 percent slopes	4,623	1.1	1,860	.9	1,929	1.3	8,412	1.1
Laidig very stony loam, 15 to 25 percent slopes	3,917	1.0	2,593	1.2	3,891	2.6	10,401	1.4
Laidig extremely stony loam, 25 to 35 percent slopes	246	.1	878	.4	79	.1	1,203	.2
Lehew channery fine sandy loam, 3 to 8 percent slopes	1,431	.3	24	(1)	155	.1	1,610	.2
Lehew channery fine sandy loam, 3 to 8 percent slopes, severely eroded	672	.2	---	--	60	(1)	732	.1
Lehew channery fine sandy loam, 8 to 15 percent slopes	2,904	.7	603	.3	633	.4	4,140	.5
Lehew channery fine sandy loam, 8 to 15 percent slopes, severely eroded	2,995	.7	---	--	631	.4	3,626	.5
Lehew channery fine sandy loam, 15 to 25 percent slopes	1,597	.4	932	.4	293	.2	2,822	.4
Lehew channery fine sandy loam, 15 to 25 percent slopes, severely eroded	1,233	.3	---	--	538	.4	1,771	.2
Lehew channery fine sandy loam, 25 to 35 percent slopes	94	(1)	308	.1	---	--	402	.1
Lehew channery fine sandy loam, 35 to 65 percent slopes	4,687	1.1	21	(1)	206	.1	4,914	.6
Lehew-Berks complex, 3 to 8 percent slopes	2,396	.6	---	--	447	.3	2,843	.4
Lehew-Berks complex, 3 to 8 percent slopes, severely eroded	1,165	.3	---	--	144	.1	1,309	.2
Lehew-Berks complex, 8 to 15 percent slopes	8,070	2.0	---	-	2,953	2.0	11,023	1.4
Lehew-Berks complex, 8 to 15 percent slopes, severely eroded	13,310	3.2	---	--	3,359	2.2	16,669	2.2
Lehew-Berks complex, 15 to 25 percent slopes	8,590	2.1	---	--	4,301	2.9	12,891	1.7
Lehew-Berks complex, 15 to 25 percent slopes, severely eroded	7,743	1.9	---	--	3,594	2.4	11,337	1.5
Lehew-Berks complex, 25 to 35 percent slopes	10,226	2.5	---	--	8,813	5.8	19,039	2.5
Lehew-Berks complex, 35 to 65 percent slopes	5,243	1.3	---	--	6,227	4.2	11,470	1.5
Lehew-Dekalb flaggy fine sandy loams, 8 to 15 percent slopes	1,353	.3	265	.1	106	.1	1,724	.2
Lehew-Dekalb flaggy fine sandy loams, 15 to 25 percent slopes	2,930	.7	722	.3	567	.4	4,219	.6
Lehew-Dekalb flaggy fine sandy loams, 25 to 35 percent slopes	1,489	.4	558	.3	618	.4	2,665	.4
Lehew-Dekalb flaggy fine sandy loams, 35 to 65 percent slopes	2,485	.6	4,337	2.0	130	.1	6,952	.9
Lindside silt loam	1,918	.5	331	.2	1,220	.8	3,469	.5
Lithic Udorthents-Rock outcrop complex	1,937	.5	102	.1	1,627	1.1	3,666	.5
Melvin silt loam	1,687	.4	312	.1	636	.4	2,635	.3
Monongahela silt loam, 0 to 3 percent slopes	879	.2	731	.3	69	.1	1,679	.2
Monongahela silt loam, 3 to 8 percent slopes	5,229	1.3	1,551	.7	1,632	1.1	8,412	1.1
Monongahela silt loam, 8 to 15 percent slopes	1,101	.3	943	.4	1,158	.8	3,202	.4
Monongahela silt loam, 8 to 15 percent slopes, severely eroded	1,107	.3	91	(1)	786	.5	1,984	.3
Murrill channery loam, 3 to 8 percent slopes	125	(1)	---	--	12	(1)	137	(1)

TABLE 1.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Hampshire County		Mineral County		Morgan County		Total acres	Total percentage of survey area
	Acres	Percent	Acres	Percent	Acres	Percent		
Murrill channery loam, 8 to 15 percent slopes	668	0.2	34	(1)	171	0.1	873	0.1
Murrill channery loam, 15 to 25 percent slopes	54	(1)	496	0.2	54	(1)	604	.1
Murrill very stony loam, 3 to 15 percent slopes	2,830	.7	135	.1	154	.1	3,119	.4
Murrill very stony loam, 15 to 25 percent slopes	2,087	.5	87	(1)	491	.3	2,665	.4
Murrill very stony loam, 25 to 35 percent slopes	1,277	.3	---	--	271	.2	1,548	.2
Murrill channery loam, clayey subsoil variant, 3 to 8 percent slopes	230	.1	26	(1)	---	--	256	(1)
Murrill channery loam, clayey subsoil variant, 8 to 15 percent slopes	789	.2	60	(1)	25	(1)	874	.1
Murrill channery loam, clayey subsoil variant, 15 to 25 percent slopes	947	.2	81	(1)	---	--	1,028	.1
Opequon-Rock outcrop complex, 8 to 25 percent slopes	1,343	.3	987	.5	19	(1)	2,349	.3
Opequon-Rock outcrop complex, 8 to 25 percent slopes, severely eroded	1,416	.3	164	.1	22	(1)	1,602	.2
Opequon-Rock outcrop complex, 25 to 65 percent slopes	3,926	1.0	5,352	2.5	726	.5	10,004	1.3
Philo fine sandy loam	915	.2	176	.1	404	.3	1,495	.2
Philo gravelly loam	1,748	.4	772	.4	131	.1	2,651	.3
Philo silt loam	1,820	.4	993	.5	1,261	.9	4,074	.5
Pope fine sandy loam	3,050	.7	2,573	1.2	225	.2	5,848	.8
Pope silt loam	338	.1	355	.2	120	.1	813	.1
Pope gravelly sandy loam	574	.1	1,996	1.0	11	(1)	2,581	.3
Purdy silty clay loam	491	.1	541	.3	28	(1)	1,060	.1
Ramsey-Dekalb extremely stony sandy loams, 8 to 25 percent slopes	1,652	.4	602	.3	252	.2	2,506	.3
Ramsey-Dekalb extremely stony sandy loams, 25 to 65 percent slopes	1,173	.3	2,677	1.3	54	(1)	3,904	.5
Rubble land	6,445	1.6	2,748	1.3	4,307	2.9	13,500	1.8
Rushtown shaly silt loam, 8 to 25 percent slopes	44	(1)	510	.2	26	(1)	580	.1
Rushtown shaly silt loam, 35 to 65 percent slopes	20	(1)	3,039	1.4	41	(1)	3,100	.4
Schaffenaker very stony loamy sand, 3 to 15 percent slopes	3,910	1.0	63	(1)	40	(1)	4,013	.5
Schaffenaker very stony loamy sand, 15 to 35 percent slopes	9,661	2.4	---	--	117	.1	9,778	1.3
Schaffenaker very stony loamy sand, 35 to 65 percent slopes	7,775	1.9	---	--	1,881	1.3	9,656	1.3
Strip mine	---	--	2,546	1.2	---	--	2,546	.3
Tygart silt loam	2,332	.6	2,003	1.0	405	.3	4,740	.6
Typic Dystrochrepts, stony, rolling	394	.1	2,682	1.3	---	--	3,076	.4
Typic Dystrochrepts, stony, steep	---	--	1,458	.7	---	--	1,458	.2
Udifluvents and Fluvaquents, very gravelly	655	.2	779	.4	364	.2	1,798	.2
Weikert shaly silt loam, 3 to 8 percent slopes, severely eroded	520	.1	16	(1)	311	.2	847	.1
Weikert shaly silt loam, 8 to 15 percent slopes, severely eroded	8,371	2.1	336	.2	2,979	2.0	11,686	1.5
Weikert shaly silt loam, 15 to 25 percent slopes, severely eroded	8,838	2.2	1,304	.6	3,234	2.2	13,376	1.7
Weikert shaly silt loam, 25 to 35 percent slopes, severely eroded	16,571	4.0	1,345	.6	2,857	1.9	20,773	2.7
Weikert shaly silt loam, 35 to 65 percent slopes, severely eroded	6,133	1.5	1,409	.7	1,761	1.2	9,303	1.2
Weikert-Berks complex, 3 to 8 percent slopes	556	.1	5	(1)	553	.4	1,114	.1
Weikert-Berks complex, 8 to 15 percent slopes	5,160	1.3	2,320	1.1	1,403	.9	8,883	1.2
Weikert-Berks complex, 15 to 25 percent slopes	5,266	1.3	9,059	4.3	1,943	1.3	16,268	2.1
Weikert-Berks complex, 25 to 35 percent slopes	16,541	4.0	20,713	9.8	3,278	2.2	40,532	5.3
Weikert-Berks complex, 35 to 65 percent slopes	6,133	1.5	24,806	11.7	2,456	1.7	33,395	4.3
Wharton silt loam, 3 to 8 percent slopes	---	--	1,014	.5	---	--	1,014	.1
Wharton silt loam, 8 to 15 percent slopes	---	--	714	.3	---	--	714	.1
Wharton very stony silt loam, 3 to 15 percent slopes	---	--	1,595	.8	---	--	1,595	.2
Water[2]	4,000	1.0	645	.3	300	.2	4,945	.6
Other land	960	.2	451	.2	381	.3	1,792	.2
Total	408,960	100.0	211,200	100.0	149,120	100.0	769,280	100.0

[1] Less than 0.05 percent.
[2] Ponds and lakes more than 40 acres in size and rivers more than one-eighth mile wide.

Bx2—34 to 50 inches, reddish-gray (5YR 5/2) channery loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) and dark-red (2.5YR 3/6) mottles; weak, very coarse, prismatic structure; very firm, brittle, and slightly plastic; common discontinuous clay films on faces of prisms; 45 percent coarse fragments; very strongly acid; clear, wavy boundary.

C—50 to 55 inches, reddish-gray (5YR 5/2) very channery loam; common, distinct, dark yellowish-brown (10YR 4/4) and dark-red (2.5YR 3/6) mottles; massive; firm; 80 percent coarse fragments; very strongly acid.

R—55 inches, red sandstone and shale bedrock.

The solum is more than 40 inches thick. Depth to the fragipan is 18 to 30 inches. Depth to bedrock is 3½ to 10 feet or more. Individual layers of the B horizon range from 10 to 50 percent coarse fragments. In unlimed areas reaction is very strongly acid or strongly acid in the upper part of the profile and very strongly acid to medium acid in the lower part of the profile.

The Ap horizon has hue of 7.5YR or 5YR, value of 3 to 5, and chroma of 3 or 4. The B horizon has hue of 5YR, 2.5YR, or 10R, value of 3 to 5, and chroma of 2 to 6. The B horizon is silty clay loam, silt loam, loam, sandy clay loam, or clay loam or their channery analogs. The lower part of the B2t horizon and the Bx and C horizons have mottles of high and low chroma.

Albrights soils are generally redder than the moderately well drained Buchanan and Clarksburg soils and the poorly drained Brinkerton soils. They have more bases in the lower part of the profile than Buchanan soils, are better drained than Brinkerton soils, and are coarser than Brinkerton and Clarksburg soils:

Albrights silt loam, 3 to 8 percent slopes (AbB).—This soil is mostly in areas around the head of streams and in long, narrow areas along small streams and drainageways. It has the profile described as representative of the series. Included in mapping are a few small areas of soils that are well drained and a few areas of poorly drained and somewhat poorly drained soils that do not have a fragipan.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions on long slopes help to divert runoff from higher lying soils. Capability unit IIe–14; woodland suitability subclass 3w.

Albrights silt loam, 8 to 15 percent slopes (AbC).—This soil is mostly in long, narrow areas at the base of uplands and along small drainageways. It has a profile similar to the one described as representative of the series, but the subsoil is thinner. Included in mapping are a few small areas of soils that are well drained and a few areas of somewhat poorly drained and poorly drained soils that do not have a fragipan.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Cultivating and stripcropping on the contour, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions on long slopes help to divert runoff from higher lying soils. Capability unit IIIe–14; woodland suitability subclass 3w.

Allegheny Series

The Allegheny series consists of deep, well-drained soils on stream terraces along the larger streams of the survey area. The soils formed in acid alluvial material washed from soils that are underlain by sandstone, siltstone, and shale. Slopes range from 3 to 15 percent.

In a representative profile the surface layer is dark-brown fine sandy loam about 8 inches thick. The subsoil is 32 inches thick. The upper 6 inches is yellowish-brown, friable loam; the next 19 inches is yellowish-brown, firm clay loam; and the lower 7 inches is yellowish-brown, pale-brown, and dark yellowish-brown, firm sandy clay loam. The substratum extends to a depth of 50 inches or more. It is yellowish-brown gravelly sandy loam mottled with pale brown.

Allegheny soils have moderate available water capacity and low natural fertility. Permeability is moderate in the subsoil.

These soils are suited to crops commonly grown in the survey area. Most areas are cleared and are used for crops and hay. The less sloping Allegheny soils provide good sites for homes. Steepness of slope is the main limitation to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Allegheny fine sandy loam, 3 to 8 percent slopes, in a meadow 250 feet south of McDowell Run, along the west side of State Route 8, in Hampshire County:

Ap—0 to 8 inches, dark-brown (10YR 4/3) fine sandy loam; weak, thin, platy structure; friable; many roots; strongly acid; clear, smooth boundary.

B1—8 to 14 inches, yellowish-brown (10YR 5/4) loam; weak, coarse, subangular blocky structure; friable, common roots; strongly acid; clear, smooth boundary.

B21t—14 to 26 inches, yellowish-brown (10YR 5/6) light clay loam; weak and moderate, medium, subangular blocky structure; firm; few to common roots; common discontinuous clay films on faces of peds; 10 percent gravel; strongly acid; gradual, wavy boundary.

B22t—26 to 33 inches, yellowish-brown (10YR 5/6) clay loam; moderate, fine and medium, subangular blocky structure; firm; common continuous clay films on faces of peds; 10 percent gravel; strongly acid; clear, smooth boundary.

B3t—33 to 40 inches, yellowish-brown (10YR 5/6), pale-brown (10YR 6/3), and dark yellowish-brown (10YR 3/4) sandy clay loam; weak and moderate, medium and coarse, subangular blocky structure; firm; few discontinuous clay films on faces of peds; 10 percent gravel and cobblestones; strongly acid; clear, smooth boundary.

IIC—40 to 50 inches, yellowish-brown (10YR 5/4) gravelly sandy loam; many, coarse, faint, pale-brown (10YR 6/3) mottles; single grained; friable; 30 percent gravel and cobblestones; strongly acid.

Depth to bedrock is more than 4 feet. Gravel content is 0 to 10 percent in the A and B horizons and 0 to 30 percent in the C horizon. In unlimed areas the profile is strongly acid to very strongly acid throughout.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 to 4. It is fine sandy loam or silt loam. The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is commonly clay loam or sandy clay loam, but in places the upper part is loam.

Allegheny soils are near the well-drained Braddock soils, the moderately well drained Monongahela soils, and the somewhat poorly drained Tygart soils. They do not have the

fragipan that is characteristic of Monongahela soils, and they have a coarser B horizon than Tygart soils.

Allegheny fine sandy loam, 3 to 8 percent slopes (AfB).—This soil is on broad terraces. It has the profile described as representative of the series. Included in mapping are a few small areas of Monongahela soils, a few small areas of soils that are less sloping than this soil, a few areas of soils that have stones on the surface, and a few areas of soils that have a shaly surface layer.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe–4; woodland suitability subclass 3o.

Allegheny silt loam, 3 to 8 percent slopes (AgB).—This soil is on broad terraces. It has a profile similar to the one described as representative of the series, but the surface layer is of finer texture. Included in mapping are a few small areas of Monongahela soils, a few small areas of soils that are less sloping than this soil, a few areas of soils that have a red, clayey subsoil, and a few areas of soils that have a thicker subsoil than this soil.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe–4; woodland suitability subclass 3o.

Allegheny silt loam, 8 to 15 percent slopes (AgC).—This strongly sloping soil is on terraces and along narrow tracts between the less sloping terraces. It has a profile similar to the one described as representative of the series, but the surface layer is of finer texture. Included in mapping are a few small areas of Monongahela soils, a few small areas of soils that are severely eroded, a few areas of soils that have a red, clayey subsoil, and a few areas of soils that have a surface layer of fine sandy loam.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The areas between the terraces are severely eroded and are used mainly for pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–4; woodland suitability subclass 3o.

Andover Series

The Andover series consists of deep, poorly drained soils in depressions and on foot slopes, mainly on the Allegheny Plateau in western Mineral County. The soils formed in acid material that moved downslope from soils that are underlain by gray and brown sandstone, siltstone, and shale. Slopes range from 3 to 8 percent.

In a representative profile the surface layer is 2 inches of black loam over 4 inches of dark grayish-brown loam that is mottled with dark brown. The subsoil is about 36 inches thick. The upper 9 inches is light brownish-gray, friable channery light sandy clay loam mottled with yellowish brown and grayish brown; the next 7 inches is light brownish-gray, firm channery sandy clay loam mottled with yellowish brown and grayish brown; and the lower 20 inches, a firm, brittle fragipan, is yellowish-brown sandy clay loam mottled with grayish brown and strong brown. The substratum extends to a depth of 54 inches. It is brown very channery loam mottled with yellowish brown and grayish brown and underlain by sandstone bedrock.

Permeability is slow in the lower part of the subsoil and moderately slow in the upper part. Available water capacity is moderate to low. The seasonal high water table is at or near the surface. Natural fertility is low.

Andover soils are unsuited to crops and hay and have only limited suitability for pasture; they are better suited to trees. Most areas are cleared and used for pasture. The seasonal high water table, slowly permeable subsoil, and very stony surface layer are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Andover very stony loam in an area of Andover and Brinkerton very stony soils, 3 to 8 percent slopes, in a pasture along Mill Branch Run, 150 feet north of U.S. Route 50, in Hampshire County:

O1—2 inches to 1 inch, hardwood leaves and twigs.

O2—1 inch to 0, black, decomposed litter, matted with roots.

A1—0 to 2 inches, black (10YR 2/1) loam; weak, fine, granular structure; loose; many roots; about 30 percent coarse fragments; very strongly acid; clear, smooth boundary.

A2—2 to 6 inches, dark grayish-brown (10YR 4/2) loam; few, distinct, dark-brown (7.5YR 4/4) mottles around roots; weak, medium, platy structure; friable; many roots; 30 percent coarse fragments; very strongly acid; clear, wavy boundary.

B21tg—6 to 15 inches, light brownish-gray (10YR 6/2) channery light sandy clay loam; common, medium, faint, yellowish-brown (10YR 5/4) and grayish-brown (10YR 5/2) mottles; weak, coarse, subangular blocky structure; friable; few roots; few discontinuous clay films on faces of peds; 20 percent coarse fragments; very strongly acid; gradual, wavy boundary.

B22tg—15 to 22 inches, light brownish-gray (10YR 6/2) channery sandy clay loam; common, medium, faint, yellowish-brown (10YR 5/4), grayish-brown (10YR 5/2), and very dark grayish-brown (10YR 3/2) mottles; weak to moderate, coarse, prismatic structure parting to weak, fine and medium, subangular blocky; firm; few roots; few discontinuous clay films on faces of peds; 20 percent coarse fragments; very strongly acid; gradual, wavy boundary.

Bxg—22 to 42 inches, yellowish-brown (10YR 5/4) sandy clay loam; common, coarse, distinct, grayish-brown (10YR 5/2) and strong-brown (7.5YR 5/6) mottles; weak, very coarse, prismatic structure; firm and brittle; few roots; few discontinuous clay films on faces of peds; 10 percent coarse fragments; very strongly acid; clear, wavy boundary.

Cg—42 to 54 inches, brown (7.5YR 5/4) very channery loam; few, fine, distinct, yellowish-brown (10YR 5/4) and grayish-brown (10YR 5/2) mottles; massive; loose; 50 percent coarse fragments; very strongly acid; abrupt; wavy boundary.
R—54 inches, fine-grained sandstone bedrock.

Depth to the fragipan is 20 to 28 inches. Depth to bedrock is 4½ feet or more. The A and B horizons are 10 to 30 percent coarse fragments, and the C horizon is as much as 50 percent coarse fragments. In unlimed areas the profile is strongly acid to very strongly acid throughout.

The A horizon has hue of 10YR. The A1 horizon has value of 2 or 3 and chroma of 1 or 2, the A2 horizon has value of 4 or 5 and chroma of 2, and the Ap horizon has value of 4 and chroma of 3 or 4. The Bt horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is loam, clay loam, sandy clay loam, or their gravelly or channery analogs. The Bx horizon has hue of 10YR, value of 5, and chroma of 3 to 8. It is loam, clay loam, sandy clay loam, or their gravelly or channery analogs. The B2t, Bx, and C horizons have mottles of high and low chroma.

Andover soils are near the well-drained Laidig soils, the moderately well drained Buchanan and Ernest soils, and the poorly drained Brinkerton soils. They are less well drained than any of those soils except Brinkerton soils. They are coarser textured throughout than Ernest and Brinkerton soils and are more acid in the lower part of the profile than Brinkerton soils.

Andover and Brinkerton very stony soils, 3 to 8 percent slopes (ArB).—These soils are in depressions, on foot slopes, around the head of streams, and along small mountain streams.

The Andover soil in this mapping unit has the profile described as representative of the Andover series. The Brinkerton soil has a profile similar to the one described as representative of the Brinkerton series, but it has a very stony surface layer. Areas consist either of Andover very stony loam or Brinkerton very stony silt loam, or both. Seep spots are common in some areas. Surface drainage is poor, and water stands in low areas for long periods.

Included with these soils in mapping are a few small areas of Buchanan, Ernest, and Atkins soils. Also included are a few small areas of soils that are loamy sand or sand throughout.

These soils are not suited to crops or hay. Because of the very stony surface layer and seasonal high water table, these soils have limited suitability to use as pasture and are better suited to trees than to most other uses. The seasonal high water table severely limits the use of woodland equipment. Capability unit VIIs–5; woodland suitability subclass 2w.

Atkins Series

The Atkins series consists of deep, poorly drained soils on flood plains. They are in areas scattered throughout the survey area. The soils formed in acid alluvial material washed from soils that are underlain by sandstone, siltstone, and shale. They are subject to flooding. Slopes range from 0 to 5 percent.

In a representative profile the surface layer is dark grayish-brown silt loam, about 10 inches thick, mottled with strong brown. The subsoil is about 30 inches thick. The upper 4 inches is gray, firm light clay loam that is mottled with yellowish brown, and the lower 26 inches is dark-gray, firm light clay loam that is mottled with dark yellowish brown. The substratum extends to a depth of 55 inches or more. It is gray, stratified sandy loam, silty clay loam, and silt loam.

Permeability is moderately slow in the subsoil. Available water capacity is high. The seasonal water table is at or near the surface. Natural fertility is low to moderate.

Drainage is needed on Atkins soils before desirable crops can be grown. If the soils are drained, commonly grown crops, hay, and pasture plants that tolerate some wetness can be grown. Most areas are cleared and are used mainly for pasture or hay. The hazard of flooding, a seasonal high water table, and moderately slow permeability are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Atkins silt loam, in a meadow along Cold Stream Road, 200 feet below Trout Pond, in Hampshire County:

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; few, medium, distinct, strong-brown (7.5YR 5/6) mottles around roots; moderate, fine and medium, granular structure; friable; many roots; strongly acid; gradual, wavy boundary.
B1g—10 to 14 inches, gray (10YR 5/1) light clay loam; many, medium, faint, yellowish-brown (10YR 5/6) mottles around roots; weak, medium, subangular blocky structure; firm and slightly sticky; many black and dark-red concretions; strongly acid; gradual, wavy boundary.
B2g—14 to 40 inches, dark-gray (N 4/0) light clay loam; many, medium, prominent, dark yellowish-brown (10YR 4/4) mottles; weak, medium, subangular blocky structure; firm and slightly plastic; few discontinuous lenses of sand and loamy sand; strongly acid; clear, smooth boundary.
Cg—40 to 55 inches +, gray (10YR 5/1) stratified sandy loam, silty clay loam, and silt loam; strongly acid.

Depth to bedrock is more than 4 feet. In unlimed areas the profile is strongly acid to very strongly acid throughout.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is silt loam or silty clay loam. The B horizon has hue of 10YR or N, value of 4 to 6, and chroma of 0 or 1. It is mostly light clay loam or light silty clay loam but is loam or silt loam in places. The profile has mottles of high chroma throughout.

Atkins soils are near the well-drained Pope soils and the moderately well drained Philo soils. They are less well drained and have a finer textured B horizon than Pope and Philo soils.

Atkins silt loam (At).—This soil is generally in long, narrow areas at the base of foot slopes on some flood plains, but in places it occupies the entire flood plain along small streams. It has the profile described as representative of the series. Runoff is generally poor, and water is ponded for long periods in some areas. Included in mapping are a few small areas of Philo soils. Also included are a few small areas of soils that have a surface layer and subsoil of sand or loamy sand, a few areas of soils that have a gravelly subsoil, and a few areas of soils along the Cacapon and North Rivers that have a redder subsoil than this soil.

If adequately drained, this soil is suited to crops commonly grown in the survey area. This soil is better suited to hay and pasture plants that consist of a mixture of water-tolerant grasses and legumes than to most other plants. Delaying pasturing or tilling of this wet soil until it is reasonably dry and firm helps to avoid compaction and loss of tilth. Capability unit IIIw–1; woodland suitability subclass 1w.

Atkins silty clay loam (Ay).—This soil is generally in long, narrow areas at the base of foot slopes on some flood plains, but in places it occupies the entire flood plain along small streams. It has a profile similar to the one described as representative of the series, but it is of finer texture. Runoff is generally poor, and water is ponded for long periods in some areas. Included in mapping are small areas of Dunning soils and a few small areas of soils that are similar to Atkins soils, but they have a darker surface layer.

If adequately drained, this soil is suited to crops commonly grown in the survey area. This soil is better suited to hay and pasture plants that consist of a mixture of water-tolerant grasses and legumes than to most other plants. Drainage is generally more difficult on this soil than on Atkins silt loam, and the choice of crops is more limited. Capability unit IVw–1; woodland suitability subclass 1w.

Berks Series

The Berks series consists of moderately deep, well-drained soils on uplands. They are throughout the survey area, except on the Allegheny Plateau of western Mineral County. The soils formed in acid material weathered from shale, siltstone, and sandstone. Slopes range from 3 to 65 percent.

In a representative profile the surface layer is 2 inches of very dark brown channery silt loam over 3 inches of dark-brown channery silt loam. The yellowish-brown, friable subsoil is 17 inches thick. The upper 4 inches is channery silt loam, and the lower 13 inches is very channery silt loam. The substratum extends to a depth of 26 inches. It is yellowish-brown very channery silt loam that is underlain by shale and siltstone bedrock.

Permeability is moderately rapid in the subsoil. Available water capacity is low to very low. Natural fertility is low.

The less sloping Berks soils are suited to crops commonly grown in the survey area. Most of the gently sloping, strongly sloping, and moderately steep soils are cleared and are used mainly for pasture or hay. Most areas of steep and very steep soils are wooded. Berks soils are droughty, and special management is needed to limit soil and water losses and to maintain fertility and good tilth. The limited depth to bedrock and steepness of slope are the main limitations to use of these soils for homesites, septic tank disposal fields, and roads and streets.

Representative profile of Berks channery silt loam, 25 to 35 percent slopes, in an area of cutover woodland, 0.6 mile east of U.S. Highway 522 along the north side of State Route 38/8, in Morgan County:

A1—0 to 2 inches, very dark brown (10YR 2/2) channery silt loam; moderate, fine, granular structure; loose; many roots; 20 percent coarse fragments; very strongly acid; clear, wavy boundary.

A2—2 to 5 inches, dark-brown (10YR 4/3) channery silt loam; weak, thin and medium, platy structure; loose; many roots; 20 percent coarse fragments; very strongly acid; clear, wavy boundary.

B1—5 to 9 inches, yellowish-brown (10YR 5/6) channery silt loam; weak, fine and medium, subangular blocky structure; friable; many roots; 30 percent coarse fragments; very strongly acid; clear, wavy boundary.

B2—9 to 22 inches, yellowish-brown (10YR 5/4) very channery silt loam; weak, medium, subangular blocky structure; friable; common roots; 50 percent coarse fragments; very strongly acid; clear, irregular boundary.

C—22 to 26 inches, yellowish-brown (10YR 5/4) very channery silt loam; massive; friable; few roots; 75 percent coarse fragments; very strongly acid; clear, wavy boundary.

R—26 inches, gray shale and siltstone.

The solum is 18 to 30 inches thick. Depth to bedrock is 20 to 40 inches. Bedrock is generally at a depth of less than 30 inches in the shaly phases. In unlimed areas the profile is strongly acid to very strongly acid throughout. Coarse fragments are 10 to 40 percent of the A horizon, 25 to 60 percent of individual layers of the B horizon, and 60 to 75 percent of the C horizon.

The A horizon has hue of 10YR; the A1 horizon has value of 2 and chroma of 1 or 2, the A2 horizon has value of 4 or 5 and chorma of 2 or 3, and the Ap horizon has value of 3 to 5 and chroma of 3. The A horizon is channery silt loam or shaly silt loam. The B horizon has hue of 10YR, value of 5, and chroma of 4 to 8 or hue of 7.5YR, value of 5, and chroma of 6 to 8. It is channery, very channery, shaly, or very shaly silt loam or loam. The C horizon is similar to the B horizon in color. It is very channery or very shaly silt loam and loam.

Berks soils are near the well-drained Calvin, Dekalb, Edom, Gilpin, Lehew, and Weikert soils. Their B and C horizons are not so red as those of Calvin, Lehew, and Edom soils. They are finer textured throughout than Dekalb and Lehew soils. They have a coarser textured B horizon than Edom and Gilpin soils, and they contain more coarse fragments in their A and B horizons than those soils. Berks soils are deeper than Weikert soils.

Berks channery silt loam, 3 to 8 percent slopes (BcB).—This soil is generally in long, narrow areas on ridgetops and benches. It has a profile similar to the one described as representative of the series, but it is commonly deeper. Included in mapping are a few small areas of soils that are less sloping than this soil, a few areas of soils that are similar to Berks soils but are deeper, a few areas that are severely eroded, and a few areas of soils that have a surface layer of nonchannery silt loam.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe–10; woodland suitability subclass 4f.

Berks channery silt loam, 8 to 15 percent slopes (BcC).—This soil is on rounded hilltops, broad ridgetops, and benches. It has a profile similar to the one described as representative of the series, but it is generally deeper. Included in mapping are a few small areas of soils that have a surface layer of silt loam and a few areas of soils that are similar to Berks soils but are deeper.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to main-

tain fertility and good tilth. Capability unit IIIe–10; woodland suitability subclass 4f.

Berks channery silt loam, 8 to 15 percent slopes, severely eroded (BcC3).—This soil has a profile similar to the one described as representative of the series, but its surface layer contains more coarse fragments. Also, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of soils that have a coarser textured surface layer.

This soil has limited suitability for crops and is better suited to hay and pasture. Many formerly cropped areas have reverted to trees; Virginia pine is the common species. The hazard of erosion is very severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions also help to control soil and water losses on long slopes. Capability unit IVe–3; woodland suitability subclass 4f.

Berks channery silt loam, 15 to 25 percent slopes (BcD).—This soil is on narrow benches and the lower part of foothills. It has a profile similar to the one described as representative of the series, but it is slightly deeper. Included in mapping are a few small areas of soils that have a sandy profile, a few areas that are stony, and a few small, narrow areas of Fluvaquents along small drainageways.

This soil has limited suitability for crops and is better suited to hay and pasture. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–3; woodland suitability subclass—north aspect 4f, south aspect 5f.

Berks channery silt loam, 15 to 25 percent slopes, severely eroded (BcD3).—This soil is on the lower part of foothills and on broad benches along the sides of mountains. It has a profile similar to the one described as representative of the series, but it generally has more coarse fragments in the surface layer. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of soils that are very stony and a few narrow areas of Fluvaquents along small drainageways.

This soil is not suited to crops but is suited to pasture and trees. Many formerly cropped areas have reverted to trees; Virginia pine is the common species. The hazard of erosion is very severe in unprotected areas. Good pasture management practices such as rotational grazing, mowing, and proper stocking help to control soil and water losses and to maintain fertility. Capability unit VIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Berks channery silt loam, 25 to 35 percent slopes (BcE).—This soil is on the sides of mountains and hills. It has the profile described as representative of the series. Included in mapping are a few small areas of soils that have a sandy profile and a few areas that are very stony.

This soil is not suited to crops but is suited to pasture and trees. Many formerly pastured areas have reverted to trees. The hazard of erosion is severe in unprotected areas. Good pasture management practices such as rotational grazing, mowing, and proper stocking help to control soil and water losses and to maintain fertility. Capability unit VIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Berks channery silt loam, 25 to 35 percent slopes, severely eroded (BcE3).—This soil is on the sides of foothills and mountains. It has a profile similar to the one described as representative of the series but generally is shallower and contains more fragments in the surface layer. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Shale and siltstone outcrops are common in some areas. Included in mapping are a few small areas of soils that are very stony and a few narrow areas of Fluvaquents along small drainageways.

This soil has limited suitability for pasture because of steepness of slopes and very severe hazard of erosion in unprotected areas. It is better suited to trees and to wildlife habitat. Good pasture management practices such as rotational grazing, mowing, and proper stocking help to control soil and water losses and to maintain fertility. The steep slopes moderately limit the use of woodland equipment. Capability unit VII–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Berks channery silt loam, 35 to 65 percent slopes (BcF).—This soil is mostly on the north-facing sides of wooded mountains and hills. It has a profile similar to the one described as representative of the series, but it is steeper and shallower. Shale, siltstone, and sandstone outcrops are in some areas. Included in mapping are a few small areas of soils that are severely eroded, a few areas that are stony, and a few narrow areas of Fluvaquents along small drainageways.

This soil is better suited to trees and to wildlife habitat than to most other uses, because of the very steep slopes and the severe hazard of erosion in unprotected areas. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Berks shaly silt loam, 3 to 8 percent slopes (BkB) — This soil has a profile similar to the one described as representative of the series, but it is less sloping, contains coarse fragments that are generally smaller, and has slightly more clay in the subsoil. Included in mapping are a few areas of Edom variant soils, a few small areas of soils that are less sloping, and a few areas that are severely eroded.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drain-

ageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions help to control soil and water losses on long slopes. Capability unit IIIe–32; woodland suitability subclass 5f.

Berks shaly silt loam, 8 to 15 percent slopes (BkC).—This soil has a profile similar to the one described as representative of the series, but it is less sloping, contains coarse fragments that are generally smaller, and has slightly more clay in the subsoil. Included in mapping are a few areas of Weikert soils and a few areas of Edom variant soils. Also included are a few small areas of soils that are similar to Berks soils but are deeper.

This soil has limited suitability for crops and is better suited to hay and pasture than to most other uses. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–32; woodland suitability subclass 5f.

Berks shaly silt loam, 8 to 15 percent slopes, severely eroded (BkC3).—This soil has a profile similar to the one described as representative of the series, but it is less sloping, contains coarse fragments that are generally smaller, and has slightly more clay in the subsoil. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few areas of Weikert soils and a few areas of Edom variant soils.

This soil is not suited to crops but is suited to pasture and trees. In places, formerly cropped areas have reverted to trees; Virginia pine is the common species. The growth of short-rooted plants is restricted during periods of low rainfall. The hazard of erosion is very severe in unprotected areas. Good pasture management practices such as rotational grazing, mowing, and proper stocking help to control soil and water losses and to maintain fertility. Capability unit VIe–31; woodland suitability subclass 5f.

Berks shaly silt loam, 15 to 25 percent slopes (BkD).—This soil occupies low positions on foothills and is also on narrow benches on uplands. It has a profile similar to the one described as representative of the series, but it is less sloping, contains coarse fragments that are generally smaller, and has slightly more clay in the subsoil. Included in mapping are a few areas of Weikert soils and a few areas of Edom variant soils. Also included are a few narrow areas of Fluvaquents along small drainageways.

This soil is not suited to crops but is suited to pasture and trees. Many formerly cropped areas have reverted to trees; Virginia pine is the common species. The hazard of erosion is severe in unprotected areas. The growth of short-rooted plants is restricted during periods of low rainfall. Good pasture management practices such as rotational grazing, mowing, and proper stocking help to control soil and water losses and to maintain fertility. Capability unit VIe–31; woodland suitability subclass—north aspect 5f, south aspect 6f.

Berks shaly silt loam, 15 to 25 percent slopes, severely eroded (BkD3).—This soil is on the lower part of rounded foothills and on narrow benches and ridgetops. It has a profile similar to the one described as representative of the series, but it is less sloping, is shallower, contains coarse fragments that are generally smaller, and has slightly more clay in the subsoil. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few areas of Weikert soils and a few areas of Edom soils, moderately shallow variant. Also included are a few small areas of soils that are very severely eroded and a few narrow areas of Fluvaquents along drainageways.

This soil is not suited to crops commonly grown in the survey area, has limited suitability to pasture, and is better suited to trees and to wildlife habitat than to most other uses. Many formerly cropped areas have reverted to trees; Virginia pine is the common species. The hazard of erosion is very severe in unprotected areas. Pastures are difficult to establish and maintain. Good pasture management practices such as rotational grazing, mowing, and proper stocking help to control soil and water losses and to maintain fertility. The moderately steep slopes moderately limit the use of woodland equipment. Capability unit VIIe–3; woodland suitability subclass—north aspect 5f, south aspect 6f.

Berks shaly silt loam, 25 to 35 percent slopes, severely eroded (BkE3).—This soil is on the sides of foothills and mountains. It has a profile similar to the one described as representative of the series, but it is shallower, contains coarse fragments that are generally smaller, and has slightly more clay in the subsoil. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few areas of Weikert soils and a few narrow areas of Fluvaquents along small drainageways.

This soil is better suited to trees and to wildlife habitat than to most other uses. The hazard of erosion is very severe in unprotected areas. Steepness of slopes moderately limits the use of woodland equipment. Capability unit VIIe–3; woodland suitability subclass—north aspect 5f, south aspect 6f.

Berks shaly silt loam, 35 to 65 percent slopes (BkF).—This soil is on foothills and sides of mountains. It has a profile similar to the one described as representative of the series, but it is steeper, is shallower to bedrock, and has slightly more clay in its subsoil. Included in mapping are a few areas of Weikert soils, a few small areas of soils that are severely eroded, and a few narrow areas of Fluvaquents along small drainageways.

This soil is better suited to trees and to wildlife habitat than to most other uses because of its very steep slopes. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIe–3; woodland suitability subclass—north aspect 5f, south aspect 6f.

Braddock Series

The Braddock series consists of deep, well-drained, gravelly soils on stream terraces, mostly along the Potomac River in Morgan County. The soils formed in

old, moderately fine, acid alluvial material washed from soils that are underlain by sandstone, siltstone, and shale. Slopes range from 3 to 15 percent.

In a representative profile the surface layer is 9 inches of dark grayish-brown gravelly loam over 5 inches of yellowish-brown silt loam. The strong-brown subsoil is about 28 inches thick. The upper 9 inches is firm heavy clay loam; the next 10 inches is firm gravelly heavy clay loam; and the lower 9 inches is firm gravelly clay loam. The substratum extends to a depth of 60 inches or more. It is strong-brown very gravelly light sandy clay loam.

Permeability is moderate in the subsoil. Available water capacity is moderate to high. Natural fertility is moderate.

Braddock soils are suited to most crops commonly grown in the survey area. Cleared areas are used mainly for crops and hay. Steepness of slope is the main limitation to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Braddock gravelly loam, 3 to 8 percent slopes, in a brushy, formerly cultivated field 100 feet north of State Route 1/5, and 0.1 mile west of its junction with State Route 10, in Morgan County:

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) gravelly loam; weak, fine and medium, granular structure; loose; many roots; 20 percent gravel; strongly acid; abrupt, smooth boundary.

A2—9 to 14 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, subangular blocky structure; friable; common roots; 15 percent gravel; very strongly acid; clear, smooth boundary.

B21t—14 to 23 inches, strong-brown (7.5YR 5/6) heavy clay loam; weak to moderate, fine, subangular blocky structure; firm; few roots; common discontinuous clay films on faces of peds; 10 to 15 percent gravel and cobblestones; very strongly acid; gradual, wavy boundary.

B22t—23 to 33 inches, strong-brown (7.5YR 5/6) heavy gravelly clay loam; weak to moderate, fine, subangular blocky structure; firm; few roots; common continuous clay films on faces of peds; 20 percent gravel and cobblestones; very strongly acid; gradual, wavy boundary.

B3t—33 to 42 inches, strong-brown (7.5YR 5/6) gravelly clay loam; weak, fine and medium, subangular blocky structure; firm; few discontinuous clay films on faces of peds and on gravel; 30 percent gravel and cobblestones; very strongly acid; gradual, wavy boundary.

C—42 to 60 inches +, strong-brown (7.5YR 5/8), very gravelly, light sandy clay loam; massive; firm; about 60 percent gravel and cobblestones; very strongly acid.

The solum is 40 to 54 inches thick. Depth to bedrock is more than 5 feet.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is 15 to 30 percent gravel. The B horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8. It is 10 to 30 percent coarse gravel; gravel content increases with depth. It is clay loam, sandy clay loam, or sandy clay, or their gravelly analogs.

In this survey area, Braddock soils are less red than is defined in the range for the series, but this difference does not alter their usefulness and behavior.

Braddock soils are near the moderately well drained Monongahela soils and the well-drained Allegheny soils. They are better drained than Monongahela soils and do not have the fragipan that is characteristic of Monongahela soils. They are more gravelly throughout than Allegheny soils.

Braddock gravelly loam, 3 to 8 percent slopes (BrB).—This soil is on broad terraces. It has the profile described as representative of the series. Included in mapping are a few small areas of a soil that has a profile of gravelly sandy loam and a few areas of less sloping soils.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe–4; woodland suitability subclass 3o.

Braddock gravelly loam, 8 to 15 percent slopes (BrC).—This soil is along areas below less sloping terraces. It has a profile similar to the one described as representative of the series, but it contains more gravel. Included in mapping are a few small areas of a soil that has a profile of gravelly sandy loam, a few that are severely eroded, and a few that are stony.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions help to control soil and water losses on long slopes. Capability unit IIIe–4; woodland suitability subclass 3o.

Brinkerton Series

The Brinkerton series consists of deep, poorly drained soils on foot slopes, mostly in Hampshire and Mineral Counties. The soils formed in acid colluvial material that moved downslope from soils that are underlain by shale, siltstone, and sandstone. Slopes range from 3 to 8 percent.

In a representative profile the surface layer is 2 inches of very dark grayish-brown silt loam over 5 inches of grayish-brown silt loam mottled with light brownish gray and yellowish brown. The subsoil is about 38 inches thick. The upper 14 inches is light brownish-gray, firm light silty clay loam mottled with strong brown. The lower part is a very firm, brittle fragipan. It is light brownish-gray and gray light silty clay loam mottled with strong brown in the upper 10 inches and gray, light brownish-gray, and strong-brown shaly light silty clay loam in the lower 14 inches. The substratum extends to a depth of 50 inches or more. It is brown, gray, and grayish-brown very shaly loam.

Permeability is slow in the lower part of the subsoil and moderately slow in the upper part. Available water capacity is moderate. The seasonal high water table is at or near the surface. Natural fertility is low to moderate.

Drainage is needed on these soils before desirable crops can be grown. If drained, nonstony Brinkerton soils are suited to commonly grown crops, hay, and pasture plants that tolerate some wetness. Most of the

acreage is wooded. Cleared areas are in pasture. The seasonal high water table, poor surface drainage, and slow permeability are limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Brinkerton silt loam, 3 to 8 percent slopes, in a pasture field along "River Road," State Route 8, about 0.3 mile south of its junction with U.S. Highway 50, in Hampshire County:

A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; many roots; 10 percent coarse fragments; slightly acid; clear, wavy boundary.

A2—2 to 7 inches, grayish-brown (10YR 5/2) silt loam; common, medium, faint, light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/8) mottles; weak, medium, platy structure; firm; many roots; 10 percent coarse fragments; medium acid; clear, smooth boundary.

B2tg—7 to 21 inches, light brownish-gray (10YR 6/2) light silty clay loam; many, distinct, strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; firm and slightly sticky; few roots; common, continuous, gray (10YR 5/1) clay films on faces of peds; 5 percent coarse fragments; strongly acid; clear, smooth boundary.

Bx1g—21 to 31 inches, light brownish-gray (2.5Y 6/2) and gray (5Y 5/1) light silty clay loam; many, prominent, strong-brown (7.5YR 5/6) mottles; moderate, very coarse, prismatic structure parting to weak, medium, platy; very firm, slightly sticky, and brittle; common discontinuous clay films on faces of prisms; 5 percent coarse fragments; very strongly acid; clear, smooth boundary.

Bx2g—31 to 45 inches, mottled gray (5Y 5/1), light brownish-gray (10YR 6/2), and strong-brown (7.5YR 5/6) shaly light silty clay loam; weak, very coarse, prismatic structure; very firm and brittle; common, discontinuous, light brownish-gray (10YR 6/2) clay films on faces of prisms; 20 percent coarse fragments; strongly acid; clear, smooth boundary.

C—45 to 50 inches +, mottled brown (10YR 5/3), gray (10YR 5/1), and grayish-brown (10YR 5/2) very shaly loam; massive; firm; about 75 percent coarse fragments; medium acid.

The solum is 40 to 50 inches thick. Depth to bedrock is greater than 4 feet. Depth to the fragipan is 16 to 30 inches. Coarse fragments make up 0 to 10 percent of the A and B2tg horizons, 5 to 20 percent of the Bx horizon, and more than 30 percent of the C horizon. In unlimed areas the profile is strongly acid to very strongly acid in the upper part and is strongly acid to medium acid in the C horizon.

The A horizon has hue of 10YR; the A1 horizon has value of 2 or 3 and chroma of 1 or 2, the A2 horizon has value of 5 or 6 and chroma of 1 or 2, and the Ap horizon has value of 4 or 5 and chroma of 2 or 3. The A horizon is silt loam or very stony silt loam. The B2tg horizon has hue of 10YR or 2.5Y, value of 6, and chroma of 2 or hue of 5Y, value of 5, and chroma of 1. It is silt loam or light silty clay loam or their shaly or channery analogs. The profile has mottles of high and low chroma throughout.

Brinkerton soils are near the well-drained Laidig soils, the moderately well drained Buchanan and Ernest soils, and the poorly drained Andover soils. They are less acid in the lower part of the profile than any of those soils, are not so well drained as any of those soils except Andover soils, and have finer A and B horizons than any of those soils except Ernest soils. They are less well drained, less red, and finer textured than Albrights soils.

Brinkerton silt loam, 3 to 8 percent slopes (BsB).—This soil is in depressions along drainageways and around the head of streams. Seep spots are common in some areas. Included in mapping are a few small areas of Ernest soils, a few small areas of a soil that has a surface layer of loam or sandy loam, a few areas of soils that are less sloping than this soil, and a few areas of soils that are shallower.

If this soil is adequately drained, it has limited suitability for crops commonly grown in the survey area. It is better suited to hay and pasture plants that consist of a mixture of water-tolerant grasses and legumes than to other plants. Diversions help to divert water received from upland areas. Delaying pasturing or tilling of this wet soil until it is reasonably dry and firm helps to avoid compaction and loss of tilth. Capability unit IVw–5; woodland suitability subclass 2w.

Buchanan Series

The Buchanan series consists of deep, moderately well drained soils on foot slopes in areas scattered throughout the survey area. The soils formed in acid colluvial material that moved downslope from soils that are underlain by sandstone and some siltstone and shale. Slopes range from 3 to 25 percent.

In a representative profile the surface layer is 1 inch of very dark gray channery loam over 8 inches of yellowish-brown channery loam. The subsoil extends to a depth of 52 inches or more. The upper 5 inches is yellowish-brown, friable loam, and the next 12 inches is strong-brown, firm sandy clay loam mottled with grayish brown and yellowish red. The lower part is a brittle fragipan. It is brownish-yellow, firm channery sandy clay loam mottled with light brownish gray and brown in the upper 10 inches and strong-brown, brown, and light brownish-gray, very firm very channery light sandy clay loam in the lower 16 inches or more.

Permeability is slow in the lower part of the subsoil and moderate in the upper part. Available water capacity is moderate. The seasonal high water table is at a depth of 1½ to 2½ feet. Natural fertility is low.

The nonstony Buchanan soils are suited to most crops commonly grown in the survey area. The fragipan restricts root development and movement of water through the soil, and in places the growth of deep-rooted legumes, such as alfalfa, is affected. About 50 percent of the areas of nonstony soils are cleared and are in pasture or hay. The areas of very stony soils are mostly wooded. A few cleared areas are in pasture. The seasonal high water table, slow permeability, and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Buchanan channery loam, 8 to 15 percent slopes, in a wooded area 500 feet west of State Route 9/14 and 1.8 miles north of State Route 9, in Morgan County:

A1—0 to 1 inch, very dark gray (10YR 3/1) channery loam; moderate, fine, granular structure; loose; many roots; 20 percent coarse fragments; very strongly acid; clear, smooth boundary.

A2—1 to 9 inches, yellowish-brown (10YR 5/4) channery loam; weak, medium, granular structure; friable; many roots; 20 percent coarse fragments; very strongly acid; clear, smooth boundary.

B1—9 to 14 inches, yellowish-brown (10YR 5/4) loam; weak, fine and medium, subangular blocky structure; friable; common roots; 10 percent coarse

fragments; very strongly acid; gradual, wavy boundary.

B2t—14 to 26 inches, strong-brown (7.5YR 5/6) sandy clay loam; few, distinct, grayish-brown (10YR 5/2) and yellowish-red (5YR 4/6) mottles; moderate, fine and medium, subangular blocky structure; firm; common roots; common discontinuous clay films on faces of peds; 15 percent coarse fragments; very strongly acid; clear, wavy boundary.

Bx1—26 to 36 inches, brownish-yellow (10YR 6/6) channery sandy clay loam; common, faint, light brownish-gray (10YR 6/2) and brown (10YR 5/3) mottles; weak, very coarse, prismatic structure parting to weak, thin, platy; firm and brittle; few roots; common discontinuous clay films on faces of prisms; 30 percent coarse fragments; very strongly acid; gradual, wavy boundary.

Bx2—36 to 52 inches +, mottled strong-brown (7.5YR 5/6), brown (10YR 5/3), and light brownish-gray (10YR 6/2) very channery light sandy clay loam; weak, very coarse, prismatic structure parting to weak, medium, subangular blocky; very firm and brittle; few discontinuous clay films on faces of prisms; 60 percent coarse fragments; very strongly acid.

The solum is 40 to 60 inches thick. Depth to the fragipan is 20 to 30 inches. Depth to bedrock is more than 5 feet. Coarse fragments make up 5 to 40 percent of individual horizons above the fragipan and as much as 60 percent of the fragipan. In unlimed areas the profile is extremely acid to strongly acid throughout.

The A horizon has hue of 10YR; the A1 horizon has value of 3 and chroma of 1 or 2, and the A2 and Ap horizons have value of 4 and chroma of 1 to 3 or value of 5 and chroma of 3 or 4. The A horizon is channery loam or very stony loam. The B1 and B2t horizons mostly have hue of 10YR, value of 5, and chroma of 4 or 6, but they also have value of 6 and chroma of 4 or 6 or hue of 7.5YR, value of 5, and chroma of 6 or 8. The B1 and B2t horizons are loam, sandy clay loam, clay loam, and their channery or gravelly analogs. The lower part of the B2t horizon and the Bx horizon has mottles of high and low chroma.

Buchanan soils are near the well drained Laidig soils, the moderately well drained Ernest soils, and the poorly drained Andover and Brinkerton soils. They are not so well drained as Laidig soils and are better drained than Andover and Brinkerton soils. Buchanan soils have coarser textured A and B horizons than Brinkerton and Ernest soils and are more acid in the lower part of the profile than Brinkerton soils. They are less red throughout than the Albrights soils and are more acid in the lower part of the profile than those soils.

Buchanan channery loam, 3 to 8 percent slopes (BuB).—This soil is on the lower part of long foot slopes near flood plains. It has a profile similar to the one described as representative of the series, but it is less sloping and has a thicker subsoil. Seep spots are common in some areas. Included in mapping are a few small areas of Andover and Laidig soils, a few small areas of soils that have a surface layer of sandy loam, and a few areas of very stony soils.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and runoff. In places, areas in which seep spots occur need to be drained. Capability unit IIe–13; woodland suitability subclass 3o.

Buchanan channery loam, 8 to 15 percent slopes (BuC).—This soil is mostly on the upper part of foot slopes and on some colluvial-alluvial fans. It has the profile described as representative of the series. Seep spots are common in some areas. Included in mapping are a few small areas of Andover and Laidig soils, a few small areas of a soil that has a surface layer of sandy loam, a few areas of very stony soils, and a few areas of soils that are shallower than this soil.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. In places, areas in which seep spots occur need to be drained. Capability unit IIIe–13; woodland suitability subclass 3o.

Buchanan very stony loam, 3 to 15 percent slopes (BvC).—This soil is on the lower part of long foot slopes around the heads of streams and is along small drainageways. It has a profile similar to the one described as representative of the series, but it has a very stony surface. Included in mapping are a few small areas of Andover and Laidig soils, a few small areas of a soil that has a surface layer of loamy sand, and a few areas of soils that are shallower than this soil.

This very stony soil is not suited to crops and hay but is suited to pasture. The hazard of erosion is moderate to severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The very stony surface restricts the use of farm machinery. Capability unit VIs–2; woodland suitability subclass 3o.

Buchanan very stony loam, 15 to 25 percent slopes (BvD).—This soil is mostly on the upper part of foot slopes adjacent to upland soils. It has a profile similar to the one described as representative of the series, but it is steeper and has a very stony surface. Included in mapping are a few small areas of Laidig soils, a few small areas of a soil that has a surface layer of sandy loam, and a few areas of soils that are shallower than this soil.

This very stony soil is not suited to crops and hay but is suited to pasture. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The very stony surface restricts the use of farm machinery. Capability unit VIs–2; woodland suitability subclass 3o.

Calvin Series

The Calvin series consists of moderately deep, well-drained soils on uplands, mostly along the eastern slopes of Allegheny Front Mountain, and in small areas in other parts of the survey area. The soils formed in acid material weathered from red shale, siltstone, and some standstone. Slopes range from 8 to 65 percent.

In a representative profile the surface layer is dark reddish-brown channery silt loam about 6 inches thick. The reddish-brown subsoil is about 22 inches thick. The upper 18 inches is friable channery heavy silt loam, and the lower 4 inches is firm very channery

heavy silt loam. The substratum extends to a depth of 30 inches. It is reddish-brown very channery heavy silt loam underlain by dark reddish-brown shale.

Permeability is moderately rapid in the subsoil. Available water capacity is low to moderate. Natural fertility is low.

The moderately sloping and moderately steep nonstony Calvin soils are suited to crops commonly grown in the survey area. The areas of nonstony soils are mostly cleared and are used mainly for pasture. The areas of extremely stony soils are generally wooded. Limited depth to bedrock and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Calvin channery silt loam, 8 to 25 percent slopes, in 20-year-old Virginia pine and mixed oak woodland, 0.9 mile east of Spruce Pine roadside park, 50 feet south of State Route 9, in Morgan County:

O1–O2—1 inch to 0, ½ inch of hardwood leaves and pine needles over ½ inch of decomposed litter.

Ap1—0 to 1 inch, dark reddish-brown (5YR 3/3) channery silt loam; weak, fine, granular structure; loose; 20 percent coarse fragments; strongly acid; clear, smooth boundary.

Ap2—1 to 6 inches, dark reddish-brown (2.5YR 3/4) channery silt loam; weak, medium and coarse, granular structure; friable; 20 percent coarse fragments; strongly acid; clear, smooth boundary.

B1—6 to 10 inches, reddish-brown (2.5YR 4/4) channery heavy silt loam; weak, fine and medium, subangular blocky structure; friable; 30 percent coarse fragments; very strongly acid; clear, smooth boundary.

B2—10 to 24 inches, reddish-brown (2.5YR 4/4) channery heavy silt loam; weak and moderate, fine and medium, subangular blocky structure; friable; 40 percent coarse fragments; very strongly acid; clear, smooth boundary.

B3—24 to 28 inches, reddish-brown (2.5YR 4/4) very channery heavy silt loam; weak, medium, subangular blocky structure; firm; 55 percent coarse fragments; very strongly acid; clear, wavy boundary.

C—28 to 30 inches, reddish-brown (2.5YR 4/4) very channery heavy silt loam; massive; firm; 75 percent coarse fragments; very strongly acid; clear, wavy boundary.

R—30 inches, dark reddish-brown shale.

The solum is 20 to 32 inches thick. Depth to bedrock is 20 to 40 inches. Coarse fragments are 0 to 30 percent of the A horizon and 20 to 55 percent of individual layers of the B horizon. In unlimed areas the profile is very strongly acid to strongly acid in the A and B horizons and very strongly acid to medium acid in the C horizon.

The Ap horizon has hue of 5YR or 2.5YR, value of 3, and chroma of 2 to 4. It is channery silt loam or silt loam. An extremely stony silt loam phase is mapped. The B horizon has hue of 5YR or 2.5YR, value of 4, and chroma of 3 to 6 or hue of 2.5YR, value of 3, and chroma of 4 or value of 4 and chroma of 2. It is channery, very channery, shaly, or very shaly silt loam and loam.

Calvin soils are near the well-drained Berks, Dekalb, and Lehew soils. They have redder B and C horizons than Berks and Dekalb soils and are finer textured than Dekalb and Lehew soils.

Calvin silt loam, 15 to 25 percent slopes (CaD).—This soil is mostly on benches extending along the upper middle part of Allegheny Front Mountain in Mineral County. It has a profile similar to the one described as representative of the series, but it is steeper, is underlain by less acid bedrock, and has fewer coarse fragments in its surface layer. Slips are present in places. Included in mapping are a few small areas of a soil that has a finer limy subsoil than this soil, a few areas of less sloping soils, and a few areas of soils that are steeper.

This soil has limited suitability for crops and is better suited to hay and pasture. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and tilth. Bluegrass pastures grow well on this soil. Capability unit IVe–11; woodland suitability subclass—north aspect 2f, south aspect 3f.

Calvin channery silt loam, 8 to 25 percent slopes (CbC).—This soil is on lower slopes of foothills and rounded ridgetops. It has the profile described as representative of the series. This soil is dominantly strongly sloping. Included in mapping are a few areas of soils that are less sloping than this soil, a few areas of soils that are steeper, a few areas of soils that have a nonchannery surface layer, and a few areas of soils that are severely eroded.

This soil has limited suitability for crops and is better suited to hay and pasture. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–3; woodland suitability subclass 4f.

Calvin extremely stony silt loam, 35 to 65 percent slopes (CcF).—This soil is mostly on benches extending along the middle part of Allegheny Front Mountain in Mineral County. It has a profile similar to the one described as representative of the series, but it is steeper, is underlain by less acid bedrock, and has an extremely stony surface. Slips are common in some areas. Included in mapping are a few small areas of a soil that has a finer textured, limy subsoil than this soil and a few areas of soils that are less sloping.

This soil is not suited to crops, hay, and pasture because of its extremely stony surface and very steep slopes. It is suited to trees and to wildlife habitat. The extremely stony surface and very steep slopes severely limit the use of woodland equipment. Capability unit VIIs–4; woodland suitability subclass—north aspect 2x, south aspect 3x.

Chagrin Series

The Chagrin series consists of deep, well-drained soils on flood plains mostly along the South Branch Potomac River, Potomac River, and Patterson Creek. The soils formed in limy alluvial materials washed mainly from lime-influenced soils. Chagrin soils are subject to flooding. Slopes range from 0 to 3 percent.

In a representative profile the surface layer is dark grayish-brown fine sandy loam about 10 inches thick. The subsoil is dark-brown friable loam about 22 inches thick. The substratum extends to a depth of 50 inches or more. It is dark-brown heavy fine sandy loam.

Permeability is moderate in the subsoil. Available water capacity is moderate to high. Natural fertility is high.

Chagrin soils are suited to all crops commonly grown in the survey area. Most areas are cleared and are used mainly for crops and hay. The hazard of flooding is the main limitation to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Chagrin fine sandy loam, in meadow about 1 mile north of mouth of "The Trough," 200 feet east of South Branch River, in Hampshire County:

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; very friable; many roots; slightly acid; abrupt, smooth boundary.

B—10 to 32 inches, dark-brown (10YR 4/3) loam; weak, medium, subangular blocky structure; friable; common roots; dark grayish-brown (10YR 4/2) faces of peds; slightly acid; gradual, wavy boundary.

C—32 to 50 inches +, dark-brown (10YR 4/3) heavy fine sandy loam; massive; friable; few roots; slightly acid.

Depth to stratified loam, fine sandy loam, and loamy fine sand is 24 to 56 inches. Depth to bedrock is more than 4 feet. In unlimed areas the profile is medium acid to neutral throughout.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3. The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma 3 or 4. It is loam or heavy fine sandy loam and includes thin layers of sandy loam.

Chagrin soils are near the well drained Huntington soils, the moderately well drained Lindside soils, the poorly drained Melvin soils, and the poorly drained and very poorly drained Dunning soils. They are coarser textured throughout than any of those soils. Chagrin soils have a lighter colored surface layer than Huntington and Dunning soils and are better drained than Lindside, Melvin, and Dunning soils.

Chagrin fine sandy loam (Cg).—This nearly level soil is along a few of the major streams in the survey area, usually in long, narrow areas near the streams. Some areas occupy the entire flood plain. Included in mapping are a few small areas of Huntington and Lindside soils and a few small areas of soils that have a gravelly surface layer.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. Crops can be grown on this soil every year, but the areas need the protection of a cover crop. Working crop residue into the soil improves tilth, fertility, and available water capacity. Crops are likely to be damaged occasionally by flooding. Capability unit IIw–6; woodland suitability subclass 1o.

Clarksburg Series

The Clarksburg series consists of deep, moderately well drained soils on foot slopes, mostly in Hampshire and Mineral Counties. The soils formed in limy colluvial material that moved downslope mainly from soils that are underlain by limestone, shale, and some siltstone and sandstone. Slopes range from 3 to 25 percent.

In a representative profile the surface layer is 8 inches of dark-brown channery silt loam over 4 inches of yellowish-brown silt loam. The subsoil extends to a depth of 52 inches or more. The upper 10 inches is yellowish-brown, friable silty clay loam; the next 7 inches is yellowish-brown, firm silty clay loam mottled with grayish brown; the lower 23 inches is a firm, brittle fragipan that is brown clay loam mottled with light brownish gray and yellowish brown.

Permeability is slow in the lower part of the subsoil and moderate in the upper part. Available water capacity is moderate. The seasonal high water table is at a depth of 1½ to 2½ feet. Natural fertility is moderate.

The nonstony Clarksburg soils are suited to crops commonly grown in the survey area. The fragipan in the lower part of the subsoil restricts root development and movement of water through the soil, and in places the growth of deep-rooted legumes, such as alfalfa, is affected. Most areas of nonstony soils are cleared and are used mainly for hay or pasture. Most areas of the very stony soils are wooded. The seasonal high water table, slow permeability, steepness of slope, and stoniness are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Clarksburg channery silt loam, 3 to 8 percent slopes, in meadow 20 feet south of U.S. Highway 50, 50 feet above entrance road into Whipp Brother farm, Hampshire County:

Ap—0 to 8 inches, dark-brown (10YR 3/3) channery silt loam; weak, fine, granular structure; loose; many roots; 20 percent coarse fragments; medium acid; clear, smooth boundary.

A2—8 to 12 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine and medium, granular structure; friable; many roots; 15 percent coarse fragments; medium acid; clear, smooth boundary.

B21t—12 to 22 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, subangular blocky structure; friable; many roots; few discontinuous clay films on faces of peds; 10 percent coarse fragments; strongly acid; clear, wavy boundary.

B22t—22 to 29 inches, yellowish-brown (10YR 5/6) silty clay loam; common, medium, faint, grayish-brown (10YR 5/2) mottles; moderate, fine and medium, subangular blocky structure; firm; continuous light brownish-gray (10YR 6/2) clay films on faces of peds; 10 percent coarse fragments; strongly acid; clear, smooth boundary.

Bx1—29 to 42 inches, brown (10YR 5/3) clay loam; many, medium, faint, light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/8) mottles; moderate, very coarse, prismatic structure parting to weak, medium, subangular blocky; firm and brittle; few clay films on faces of prisms; 5 percent coarse fragments; medium acid; clear, smooth boundary.

Bx2—42 to 52 inches +, brown (10YR 5/3) clay loam; many, medium, faint, yellowish-brown (10YR 5/8) and light brownish-gray (10YR 6/2) mottles; weak, very coarse, prismatic structure; firm and brittle; common discontinuous clay films on faces of prisms; reddish and black brown concretions in discontinuous wavy bands and pockets; 15 percent coarse fragments; slightly acid.

The solum is 40 to 60 inches thick. Depth to the brittle fragipan is 20 to 34 inches. Depth to bedrock is more than 5 feet. Coarse fragments are 5 to 20 percent of the A and B2t horizons, 5 to 30 percent of the Bx horizon, and 20 to 70 percent of the C horizon. In unlimed areas the profile is strongly acid to slightly acid throughout.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 3 or 4. A very stony silt loam phase is mapped. The B2t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8. It is silty clay loam, clay loam, heavy silt loam, or their channery and gravelly analogs. The Bx horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 3 to 8 and includes hue of 5YR, value of 4, and chroma

of 3 or 4. It is clay loam, silty clay loam, silt loam, or their channery or gravelly analogs.

Clarksburg soils are near the well-drained Murrill and Murrill variant soils. They have a less acid profile than those soils. They are less well drained than Murrill and Murrill variant soils, and generally the A horizon and the upper part of the B horizon are finer textured. Clarksburg soils are less red and somewhat finer textured throughout than Albrights soils.

Clarksburg channery silt loam, 3 to 8 percent slopes (CkB).—This soil has the profile described as representative of the series. It is mostly on the lower part of long foot slopes along drainageways. Seep spots are common in some areas. Included in mapping are a few small areas of Lindside soils, a few small areas of soils that are less well drained than this soil, a few areas of more acid soils, and a few areas of less sloping soils.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. In places, areas in which spots occur need to be drained. Capability unit IIe–14; woodland suitability subclass 3w.

Clarksburg channery silt loam, 8 to 15 percent slopes (CkC).—This soil is mostly on the middle and upper parts of long foot slopes. It has a profile similar to the one described as representative of the series, but it is steeper and generally has a slightly thinner fragipan. Seep spots are common in some areas. Included in mapping are a few small areas of soils that are less well drained than this soil, a few areas of steeper soils, a few areas of more acid soils, and a few areas of soils that have a nonchannery surface layer.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. In places, areas in which seep spots occur need to be drained. Capability unit IIIe–14; woodland suitability subclass 3w.

Clarksburg very stony silt loam, 3 to 15 percent slopes (ClC).—This soil is on foot slopes and around the heads of streams. It has a profile similar to the one described as representative of the series, but it has a very stony surface. Included in mapping are a few small areas of Brinkerton soils, a few small areas of soils that are well drained, a few areas of soils that are less sloping than this soil, and a few areas of extremely stony soils.

This very stony soil is not suited to crops and hay but is suited to pasture. The hazard of erosion is moderate to severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The very stony surface restricts the use of farm machinery. Capability unit VIs–1; woodland suitability subclass 3w.

Clarksburg very stony silt loam, 15 to 25 percent slopes (ClD).—This soil is mostly on the upper part of long foot slopes. It has a profile similar to the one described as representative of the series, but it generally has a slightly thinner fragipan and a very stony surface. Included in mapping are a few small areas of soils that are well drained and a few areas of extremely stony soils.

This very stony soil is not suited to crops and hay but is suited to pasture. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIs–1; woodland suitability subclass 3w.

Dekalb Series

The Dekalb series consists of moderately deep, well-drained soils on uplands in areas scattered throughout the survey area. The soils formed in acid material weathered mainly from sandstone and some siltstone and shale. Slopes range from 3 to 65 percent.

In a representative profile the surface layer is 1 inch of very dark grayish-brown sandy loam over 7 inches of yellowish-brown sandy loam. The subsoil is yellowish-brown, friable and firm channery sandy loam about 16 inches thick. The substratum extends to a depth of 27 inches or more. It is yellowish-brown very channery sandy loam underlain by sandstone bedrock.

Permeability is moderately rapid throughout. Available water capacity is low to very low. Natural fertility is low.

The strongly sloping and moderately steep, nonstony Dekalb soils are suited to crops commonly grown in the survey area. The steep and very steep, nonstony soils and the very stony and extremely stony soils are better suited to trees than to other purposes. Most areas of Dekalb soils are wooded. The soils are droughty, and special management is needed to limit soil and water losses and to maintain fertility and good tilth.

The nonstony Dekalb soils are mapped in complexes with Lehew soils. The extremely stony Dekalb soils are mapped in complexes with Ramsey soils.

Limited depth to bedrock and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Dekalb sandy loam, in an area of Dekalb and Lehew very stony sandy loams, 3 to 15 percent slopes, in a wooded area of Bear Garden Mountain, about ½ mile north of U.S. Highway 50, 100 feet west of ridge road, in Hampshire County:

A1—0 to 1 inch, very dark grayish-brown (10YR 3/2) sandy loam; moderate, fine, granular structure; loose; many roots; 20 percent coarse fragments; strongly acid; clear, smooth boundary.

A2—1 to 8 inches, yellowish-brown (10YR 5/4) sandy loam; weak, fine, granular structure; loose; many roots; 20 percent coarse fragments; strongly acid; clear, smooth boundary.

B1—8 to 12 inches, yellowish-brown (10YR 5/6) channery sandy loam; weak, coarse, subangular blocky structure; friable; many roots; 30 percent coarse fragments; strongly acid; clear, smooth boundary.

B2—12 to 24 inches, yellowish-brown (10YR 5/6) channery sandy loam; weak, medium and coarse, subangular

blocky structure; firm; common roots; 45 percent coarse fragments; strongly acid; gradual, wavy boundary.

C—24 to 27 inches, yellowish-brown (10YR 5/6) very channery sandy loam; weak, coarse, subangular blocky structure; firm; few roots; 80 percent coarse fragments; very strongly acid; abrupt, wavy boundary.

R—27 inches, hard sandstone bedrock.

The solum is 20 to 34 inches thick. Depth to bedrock is 20 to 40 inches. Coarse fragments are 10 to 40 percent of the A horizon and 15 to 50 percent of individual layers of the B horizon. In unlimed areas the profile is very strongly acid to strongly acid throughout.

The A horizon has hue of 10YR; the A1 horizon has value of 2 or 3 and chroma of 1 or 2; the A2 horizon has value of 5 or 6 and chroma of 2 through 4; and the Ap horizon has value of 4 and chroma of 2 through 4. The A horizon is flaggy fine sandy loam or very stony and extremely stony sandy loam. The B horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8 or hue of 10YR, value of 5, and chroma of 4. It is channery or very channery sandy loam and loam. The C horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 or 6. It is channery or very channery sandy loam and loamy sand.

Dekalb soils are near the somewhat excessively drained Ramsey soils and the well-drained Berks, Calvin, Lehew, Ramsey, Schaffenaker, and Elliber soils. They are not so red in the B and C horizons as Calvin and Lehew soils. They are coarser textured throughout than Berks and Calvin soils and contain more coarse fragments in the profile than Ramsey and Schaffenaker soils. Dekalb soils are shallower than Elliber soils and deeper than Ramsey soils.

Dekalb and Lehew very stony sandy loams, 3 to 15 percent slopes (DIC).—These soils are mostly on narrow tops of ridges and mountains. The DeKalb part of this mapping unit has the profile described as representative of the Dekalb series. The Lehew part has a profile similar to the one described as representative of the Lehew series, but it is shallower and has a very stony surface. Most areas consist of both soils, but some areas consist of either Dekalb soils or of Lehew soils. Included in mapping are a few small areas of soils that are less sloping, a few areas of extremely stony soils, and a few areas of soils that are severely eroded.

These soils are not suited to crops, hay, and pasture because they have a very stony surface. They are better suited to trees and to wildlife habitat than to other purposes. Capability unit VIIs–2; woodland suitability subclass 4f.

Dekalb and Lehew very stony sandy loams, 15 to 35 percent slopes (DIE).—These soils are mostly on narrow ridges and mountain slopes. The Dekalb soil has a profile similar to the one described as representative of the Dekalb series, but it is slightly deeper over bedrock. The Lehew soil has a profile similar to the one described as representative of the Lehew series, but it has a very stony surface. Most areas are made up of both soils, but some areas are either all Dekalb soils or all Lehew soils. Included in mapping are a few small areas of soils that are extremely stony and a few areas of soils that are severely eroded.

These soils are not suited to crops, hay, or pasture because of stoniness. They are better suited to trees and to wildlife habitat than to other purposes. Their moderately steep and steep slopes moderately limit the use of woodland equipment. Capability unit VIIs–2, woodland suitability subclass—north aspect 4f, south aspect 5f.

Dekalb and Lehew very stony sandy loams, 35 to 65 percent slopes (DIF).—These soils are mostly on very steep slopes of mountains. The Dekalb part of this mapping unit has a profile similar to the one described as representative of the Dekalb series, but it is slightly shallower and has a very stony surface. The Lehew part has a profile similar to the one described as representative of the Lehew series, but it has a very stony surface. Most areas are dominantly Dekalb soils, but some areas are Dekalb and Lehew soils in about equal proportions. Included in mapping are a few areas of soils that are extremely stony and a few areas of soils that are severely eroded.

These soils are not suited to crops, hay, and pasture, because they are very steep and very stony. They are better suited to woodland and to wildlife habitat than to other purposes. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIs–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Dunning Series

The Dunning series consists of deep, poorly drained and very poorly drained soils on flood plains in areas widely scattered throughout the survey area. The soils formed in limy alluvial material washed mainly from soils that are underlain mainly by limestone and shale. They are subject to flooding. Slopes range from 0 to 3 percent.

In a representative profile the surface layer is 9 inches of very dark gray silty clay loam mottled with olive brown over 3 inches of very dark grayish-brown silty clay loam mottled with olive brown. The gray subsoil is about 34 inches thick. The upper 16 inches is very firm clay mottled with olive brown and strong brown, and the lower 18 inches is very firm silty clay mottled with olive brown and grayish brown. The substratum extends to a depth of 58 inches or more. It is gray silty clay stratified with light yellowish-brown and dark-gray gravelly sandy loam, silt loam, and clay loam.

Permeability is slow in the subsoil. Available water capacity is high. The seasonal high water table is at or near the surface. Natural fertility is high.

Drainage is needed before desirable crops can be grown on these soils. If the soils are drained, commonly grown crops, hay, and pasture plants that tolerate some wetness can be grown. Most areas are cleared and are used for hay and pasture. The seasonal high water table, slow permeability, and hazard of flooding are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Dunning silty clay loam, in a meadow 330 yards west of State Route 8, 550 yards east-southeast of the South Branch Potomac River and 1.1 mile east-northeast of Sawmill Run, in Hampshire County:

Ap—0 to 9 inches, very dark gray (10YR 3/1) silty clay loam; common, fine, distinct, olive-brown (2.5YR 4/4) mottles around roots; moderate and strong, fine and medium, subangular blocky structure; firm, slightly sticky, and slightly plastic; mildly alkaline; clear, smooth boundary.

A2—9 to 12 inches, very dark grayish-brown (10YR 3/2) silty clay loam; common, fine, distinct, olive-brown (2.5YR 4/4) mottles; strong, fine and medium, angular blocky structure; firm, slightly sticky, and slightly plastic; slightly acid; clear, smooth boundary.

B2g—12 to 28 inches, gray (10YR 5/1) clay; common, medium, distinct, olive-brown (2.5YR 4/4) and strong-brown (7.5YR 5/6) mottles; weak and moderate, medium and coarse, prismatic structure parting to moderate and strong, coarse, angular blocky; very firm, sticky, and plastic; slightly acid; clear, smooth boundary.

B3g—28 to 46 inches, gray (10YR 6/1) silty clay; common, medium, distinct, olive-brown (2.5YR 4/4) and grayish-brown (10YR 5/2) mottles; weak, coarse, prismatic structure parting to weak, thick, platy; very firm, sticky, and plastic; medium acid; clear, smooth boundary.

Cg—46 to 58 inches +, gray (N 5/0) silty clay, with light yellowish-brown (10YR 6/4) and dark-gray (N 4/0), stratified gravelly sandy loam, silt loam, and clay loam; massive; friable to firm; medium acid.

The solum is 30 to 46 inches thick. Depth to bedrock is more than 40 inches. In unlimed areas the profile is medium acid to mildly alkaline throughout.

Most of the A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The B horizon has hue of 10YR, value of 5 or 6, and chroma of 1. It is heavy silty clay loam, silty clay, or clay. The profile has mottles of high chroma throughout.

Dunning soils are near the well-drained Huntington and Chagrin soils, the moderately well drained Lindside soils, and the poorly drained Melvin soils. They are not so well drained as any of those soils except Melvin soils. They have finer textured A and B horizons than those soils and a darker A horizon than Chagrin, Lindside, and Melvin soils.

Dunning silty clay loam (Du).—This soil is in low areas on flood plains and around the heads of streams. Surface runoff is generally slow, and water is likely to be ponded for long periods. Included in mapping are small areas of Melvin soils, a few areas of soils that have coarse fragments in the lower part of the profile, a few areas of soils that have coarse fragments throughout the profile, and a few areas of soils that are shallower than this soil.

If this soil is adequately drained, it is suited to crops commonly grown in the survey area. It is better suited to hay and pasture plants that consist of a mixture of water-tolerant grasses and legumes than to other crops. Drainage is difficult because of the fine textured, slowly permeable subsoil (fig. 3). Delaying pasturing

Figure 3.—Bedding for surface drainage in an area of a Dunning silty clay loam.

or tilling of this wet soil until it is reasonably dry and firm helps to avoid compaction and loss of tilth. Capability unit IVw–1; woodland suitability subclass 1w.

Edom Series

The Edom series consists of deep, well-drained soils in widely scattered areas on uplands, mostly in Hampshire and Mineral Counties. The soils formed in material weathered from shaly limestone and calcareous shale. Slopes range from 8 to 65 percent.

In a representative profile the surface layer is 1 inch of dark grayish-brown silt loam over 3 inches of brown silt loam. The subsoil is about 31 inches thick. The upper 7 inches is strong-brown, firm silty clay loam; the next 8 inches is yellowish-red, firm silty clay; and the lower 16 inches is yellowish-red, very firm shaly clay. The substratum extends to a depth of 42 inches. It is yellowish-red very shaly silty clay loam underlain by shale and limestone bedrock.

Permeability is moderate in the subsoil. Available water capacity is moderate to high. Natural fertility is moderate to high.

The strongly sloping and moderately steep Edom soils are suited to most crops commonly grown in the survey areas. More than 50 percent of the acreage is cleared and is used mainly for pasture. Most areas of steep and very steep soils are wooded. Limited depth to bedrock, moderate to high shrink-swell potential, and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Edom silt loam, 8 to 15 percent slopes, described in a pasture field on Mill Creek Mountain along AT&T cable trench; about 765 yards north-northeast of the junction of State Routes 220/11 and 220/14, in Hampshire County:

A1—0 to 1 inch, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; loose; many roots; strongly acid; clear, wavy boundary.

A2—1 to 4 inches, brown (10YR 5/3) silt loam; weak, fine, subangular blocky structure; loose; many roots; strongly acid; gradual, wavy boundary.

B1—4 to 11 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate and strong, fine and medium, subangular blocky structure; firm; many roots; less than 5 percent coarse fragments; medium acid; clear, wavy boundary.

B21t—11 to 19 inches, yellowish-red (5YR 4/6) silty clay; strong, medium and coarse, subangular blocky structure; firm; many roots; few discontinuous clay films on faces of peds; 5 percent coarse fragments; medium acid; clear, wavy boundary.

B22t—19 to 26 inches, yellowish-red (5YR 4/6) shaly clay; strong, fine and medium, subangular blocky structure; very firm; few discontinuous clay films on faces of peds; 30 percent coarse fragments; medium acid; clear, wavy boundary.

B3t—26 to 35 inches, yellowish-red (5YR 4/6) shaly clay; weak, medium and coarse, subangular blocky structure; very firm; few discontinuous clay films on faces of peds; 30 percent coarse fragments; neutral; clear, wavy boundary.

C—35 to 42 inches, yellowish-red (5YR 4/6) very shaly silty clay loam, filling interstices between interbedded shale and limestone fragments that make up about 70 percent of the horizon; massive; firm; neutral; clear, irregular boundary.

R—42 inches, alkaline shale and thin limestone.

The solum is 20 to 40 inches thick. Depth to bedrock is 40 inches or more. Coarse fragments make up 0 to 15 percent of the A horizon, 2 to 30 percent of the B horizon, and as much as 90 percent of the C horizon. In unlimed areas reaction is strongly acid or medium acid in the upper part of the profile and medium acid to neutral in the lower part.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3 or hue of 7.5YR, value of 4, and chroma of 2 or 4. It is silt loam or silty clay loam. The B horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is mainly silty clay, clay, or their shaly analogs; silty clay loam is in the upper part of some B horizons.

Edom soils are near the well-drained Berks, Edom variant, Elliber, and Opequon soils. They commonly have redder B and C horizons than Berks soils, contain fewer coarse fragments in the A and B horizons than Berks and Elliber soils, and are deeper than Opequon soils and Edom variant soils. Edom soils have finer textured B and C horizons than Berks soils, are finer textured throughout than Elliber soils, and are less acid throughout than Berks and Elliber soils.

Edom silt loam, 8 to 15 percent slopes (EaC).—This soil is mostly on benches and broad ridgetops. It has the profile described as representative of the series. Included in mapping are a few small areas of soils that are less sloping than this soil and a few areas of soils that are severely eroded.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–11; woodland suitability subclass 3c.

Edom silt loam, 15 to 25 percent slopes (EaD).—This soil is mostly in narrow areas on low hills and on narrow benches in high hilly areas. It has a profile similar to the one described as representative of the series, but it is steeper and shallower. Included in mapping are a few small areas of Opequon-Rock outcrop complex and Edom variant soils, a few small areas of soils that are stony, and a few small areas of Fluvaquents along small drainageways.

This soil has limited suitability for crops and is better suited to hay and pasture. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–11; woodland suitability subclass—north aspect 3c, south aspect 4c.

Edom silt loam, 25 to 35 percent slopes (EaE).—This soil is mostly along the sides of mountains and short hills. It has a profile similar to the one described as representative of the series, but it is steeper and shallower. Limestone and limy shale outcrops are present in some areas. Included in mapping are a few small areas of the Opequon-Rock outcrop complex and Edom variant soils, a few small areas of a soil that is stony, and a few small areas of Fluvaquents along small drainageways.

The soil is not suited to crops but is suited to pasture and trees. Many formerly cleared areas have reverted to trees. The hazard of erosion is severe in

unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIe–1; woodland suitability subclass—north aspect 3c, south aspect 4c.

Edom silty clay loam, 8 to 15 percent slopes, severely eroded (EbC3).—This soil is mostly on benches and narrow ridgetops. It has a profile similar to the one described as representative of the series, but it has a finer textured surface layer. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Opequon-Rock outcrop complex and a few stony areas.

This soil has limited suitability for crops and is better suited to hay and pasture. The hazard of erosion is very severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–11; woodland suitability subclass 3c.

Edom silty clay loam, 15 to 25 percent slopes, severely eroded (EbD3).—This soil is mostly in narrow areas on south-facing and west-facing slopes of low hills. It has a profile similar to the one described as representative of the series, but it is steeper and less deep and has a finer textured surface layer. In addition, erosion has removed most of its original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Opequon-Rock outcrop complex and Edom variant soils and a few small areas of Fluvaquents along narrow drainageways.

This soil is not suited to crops but is suited to pasture and trees. The hazard of erosion is very severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIe–1; woodland suitability subclass—north aspect 3c, south aspect 4c.

Edom silty clay loam, 25 to 65 percent slopes, severely eroded (EbF3).—This soil is along the sides of mountains and short hills. It has a profile similar to the one described as representative of the series, but it is steeper and less deep and has a finer textured surface layer. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Limestone and limy shale outcrops are present in some areas. Included in mapping are a few small areas of Opequon-Rock outcrop complex and Edom variant soils and a few small areas of Fluvaquents along narrow drainageways.

This soil has limited suitability for pasture because of its steep and very steep slopes and very severe hazard of erosion in unprotected areas. It is better suited to trees and to wildlife habitat than to other purposes. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIe–1; woodland suitability subclass—north aspect 3c, south aspect 4c.

Edom Variant

The Edom variant consists of moderately deep, well-drained soils in widely scattered areas on uplands, mostly in Hampshire and Mineral Counties. The soils formed in material weathered from calcareous shale and shaly limestone. Slopes range from 8 to 35 percent.

In a representative profile the surface layer is dark-brown silt loam about 6 inches thick. The subsoil is about 14 inches thick. The upper 2 inches is reddish-brown, friable light silty clay loam; the next 7 inches is yellowish-red, firm silty clay; and the lower 5 inches is yellowish-red, firm shaly silty clay. The substratum extends to a depth of 23 inches. It is yellowish-red, very shaly silty clay underlain by tilted shale bedrock.

Permeability is moderate in the subsoil. Available water capacity is low to moderate. Natural fertility is moderate.

The strongly sloping Edom variant soils have limited suitability for cultivated crops. The moderately steep and steep soils are better suited to pasture or trees than to other purposes. More than 50 percent of the acreage is cleared and is mostly in pasture. The soils are somewhat droughty, and special management is needed to limit soil and water losses and to maintain fertility and good tilth. Limited depth to bedrock, moderate to high shrink-swell potential, and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Edom silt loam, moderately shallow variant, 8 to 15 percent slopes, in a pasture field, 250 yards east of State Route 28, 300 yards south of Springfield Grade School, in Hampshire County:

Ap—0 to 6 inches, dark-brown (7.5YR 4/4) silt loam; moderate, fine and medium, granular structure; friable; medium acid; clear, smooth boundary.

B1t—6 to 8 inches, reddish-brown (5YR 5/4) light silty clay loam; weak and moderate, fine, subangular blocky structure; friable; few discontinuous clay films on faces of peds; medium acid; clear, smooth boundary.

B21t—8 to 15 inches, yellowish-red (5YR 5/6) silty clay; moderate and strong, fine, subangular blocky structure; firm; few discontinuous clay films on faces of peds; 10 percent coarse fragments; medium acid; clear, wavy boundary.

B22t—15 to 20 inches, yellowish-red (5YR 4/6) shaly silty clay; strong, fine and medium, subangular blocky structure; firm; common continuous clay films on faces of peds; 30 percent coarse fragments; neutral; clear, wavy boundary.

C—20 to 23 inches, yellowish-red (5YR 4/6) very shaly silty clay; massive; firm; 70 percent thin shale; neutral; clear, irregular boundary.

R—23 inches, thin shale on edge.

The solum is 18 to 36 inches thick. Depth to bedrock is 18 to 40 inches. Coarse fragments make up 2 to 30 percent of the B horizon and as much as 80 percent of the C horizon. In unlimed areas the profile is strongly acid or medium acid in the upper part and medium acid to neutral in reaction in the lower part.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is silt loam or silty clay loam. The B horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is silty clay loam, silty clay, clay, or their shaly analogs.

Edom variant soils are near well-drained Edom, Opequon, and Weikert soils. They are shallower than Edom soils and deeper than Weikert soils. They contain fewer coarse frag-

ments in the A and B horizons, are less acid throughout, and commonly have redder B and C horizons than Weikert soils.

Edom silt loam, moderately shallow variant, 8 to 15 percent slopes (EcC).—This soil is on the top of broad hills and ridges and on narrow benches. It has the profile described as representative of the series. Included in mapping are a few small areas of Berks soils and a few small areas of shallow soils.

This soil has limited suitability for crops and is better suited to hay and pasture than to other purposes. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions help to control soil and water losses on long slopes. Capability unit IVe–31; woodland suitability subclass 4c.

Edom silt loam, moderately shallow variant, 15 to 25 percent slopes (EcD).—This soil is on rounded hilltops and at the base of hills. Included in mapping are a few areas of Berks soils and a few small areas of shallow soils.

This soil is not suited to crops but is suited to pasture. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIe–31; woodland suitability subclass—north aspect 4c, south aspect 5c.

Edom silt loam, moderately shallow variant, 25 to 35 percent slopes (EcE).—This soil is on the sides of steep hills and mountains. It has a profile similar to the one described as representative of the series, but it is steeper and slightly shallower. Included in mapping are a few small areas of Berks soils and a few small areas of shallow soils.

This soil is not suited to crops and has limited suitability for pasture. It is better suited to trees and to wildlife habitat than to other purposes. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Steepness of slope moderately limits the use of woodland equipment. Capability unit VIIe–3; woodland suitability subclass—north aspect 4c, south aspect 5c.

Edom silty clay loam, moderately shallow variant, 8 to 15 percent slopes, severely eroded (EdC3).—This soil is on the top of broad hills and ridges and on benches. It has a profile similar to the one described as representative of the series, but it is slightly shallower and has a finer textured surface layer. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Berks soils and a few small areas of shallow soils.

This soil is not suited to crops but is suited to pasture. The hazard of erosion is very severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIe–31; woodland suitability subclass 4c.

Edom silty clay loam, moderately shallow variant, 15 to 25 percent slopes, severely eroded (EdD3).—This soil is on the top of rounded hills and ridges and on lower slopes. It has a profile similar to the one described as representative of the series, but it is steeper and slightly shallower and has a finer textured surface layer. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Berks soils and a few small areas of shallow soils.

This soil is not suited to crops and has limited suitability for pasture. It is better suited to trees and to wildlife habitat than to other purposes. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Steepness of slope moderately limits the use of woodland equipment. Capability unit VIIe–3; woodland suitability subclass—north aspect 4c, south aspect 5c.

Elliber Series

The Elliber series consists of deep, well-drained soils on uplands in mountainous areas, mostly in Hampshire and Mineral Counties. The soils formed in acid material weathered from cherty limestone. Slopes range from 8 to 65 percent.

In a representative profile the surface layer is 4 inches of black very cherty loam over 8 inches of pale-brown very cherty loam. The subsoil is yellowish-brown, friable very cherty loam about 38 inches thick. The substratum extends to a depth of 70 inches or more. It is yellowish-brown very cherty sandy loam.

Permeability is moderately rapid. Available water capacity is low to moderate. Natural fertility is moderate to high.

The strongly sloping and moderately steep, nonstony Elliber soils have limited suitability for crops. The steep and very steep and very stony soils are better suited to trees than to other purposes. Most areas of very stony soils are wooded. Elliber soils are considered excellent for apple orchards. Steepness of slope and coarse fragments are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Elliber very cherty loam, 15 to 25 percent slopes, in orchard in Mineral County, on Patterson Creek Mountain, 100 yards northwest of State Route 13, 250 yards southwest of apple-packing and storage shed, and ¾ mile north-northeast of the common corner of Mineral, Hampshire, Grant, and Hardy Counties.

O1—1 inch to 0, thin layer of leaves and twigs over thin layers of black mull.

A1—0 to 4 inches, black (10YR 2/1) very cherty loam; weak, fine, granular structure; loose; many roots; 75 percent coarse fragments; very strongly acid; clear, wavy boundary.

A2—4 to 12 inches, pale-brown (10YR 6/3) very cherty loam; moderate, fine, granular structure; loose; many roots; 75 percent coarse fragments; very strongly acid; clear, wavy boundary.

B21—12 to 33 inches, yellowish-brown (10YR 5/6) very cherty loam; weak, medium, subangular blocky structure; friable; common roots; 80 percent coarse fragments; very strongly acid; diffuse boundary.

B22t—33 to 50 inches, yellowish-brown (10YR 5/4) very cherty loam; weak, medium, subangular blocky structure; friable; few roots; clay films in pores, some clay bridging; 80 percent coarse fragments; very strongly acid; clear, wavy boundary.

C—50 to 70 inches +, yellowish-brown (10YR 5/4) very cherty sandy loam; single grained; loose; 80 percent coarse fragments; very strongly acid.

The solum is 40 to 70 inches thick. Depth to bedrock is more than 4 feet. Coarse fragments are 50 to 80 percent throughout. In unlimed areas the profile is extremely acid to strongly acid throughout.

The A horizon has hue of 10YR; the A1 horizon has value of 2 or 3 and chroma of 1 or 2; the A2 horizon has value of 6 and chroma of 3 or 4; and the Ap horizon has value of 4 or 5 and chroma of 2 or 3. The A horizon is very cherty loam or very stony loam. The B horizon has hue of 10YR, value of 5 or 6, and chroma of 4 or 6. It is loam, sandy loam, silt loam, or light silty clay loam and is cherty or very cherty.

Elliber soils are near well-drained Dekalb, Edom, and Opequon soils. They are deeper than Dekalb and Opequon soils. Their B and C horizons are not so red as those of Opequon and Edom soils, and they are coarser textured and more acid throughout than Edom and Opequon soils. Elliber soils have more coarse fragments in the profile than Edom and Opequon soils.

Elliber very cherty loam, 8 to 15 percent slopes (ElC).—This soil is on fairly broad ridgetops and benches. It has a profile similar to the one described as representative of the series, but has slightly fewer coarse fragments in the surface layer. Included in mapping are a few small areas of soils that are less sloping than this soil, a few areas of coarser textured soils, and a few areas of shallower soils.

This soil has limited suitability for crops and is better suited to hay and pasture. The very cherty surface layer makes tilling difficult. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVs–26; woodland suitability subclass 3f.

Elliber very cherty loam, 15 to 25 percent slopes (ElD).—This soil is mostly on the sides of ridgetops. It has the profile described as representative of the series. Included in mapping are a few small areas of soils that are shallower than this soil and a few areas of coarser textured soils.

This soil is not suited to crops but is suited to pasture and trees. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIs–26; woodland suitability subclass—north aspect 2f, south aspect 3f.

Elliber very cherty loam, 25 to 35 percent slopes (ElE).—This soil is on the longer, lower sides of mountains. It has a profile similar to the one described as representative of the series, but it is steeper and slightly shallower. Rock outcrops are present in some areas. Included in mapping are a few small areas of soils that are shallower than this soil, a few areas of coarser textured soils, and a few areas of soils that are steeper.

This soil has limited suitability for pasture because it is steep and has a very cherty surface layer. It is better suited to trees and to wildlife habitat. The steep slopes moderately limit the use of woodland equipment. Capability unit VIIs–26; woodland suitability subclass—north aspect 2f, south aspect 3f.

Elliber very stony loam, 15 to 35 percent slopes (EmE).—This soil is on ridgetops, benches, and side slopes. It has a profile similar to the one described as representative of the series, but it has a very stony surface. Included in mapping are a few small areas of soils that are less sloping than this soil, a few areas of soils that are extremely stony, and a few areas of coarser textured soils.

This soil is not suited to crops, hay, or pasture because it has a very stony surface. It is better suited to trees and to wildlife habitat than to other purposes. Its moderately steep and steep slopes moderately limit the use of woodland equipment. Capability unit VIIs–1; woodland suitability subclass—north aspect 2f, south aspect 3f.

Elliber very stony loam, 35 to 65 percent slopes (EmF).—This soil is on very steep sides of mountains. It has a profile similar to the one described as representative of the series, but it is steeper and shallower and has a very stony surface. Included in mapping are a few small areas of soils that are extremely stony and a few areas of coarser textured soils.

This soil is not suited to crops, hay, and pasture because of its very steep slopes and its very stony surface. It is better suited to trees and to wildlife habitat than to other purposes. Its very steep slopes severely limit the use of woodland equipment. Capability unit VIIs–1; woodland suitability subclass—north aspect 2f, south aspect 3f.

Ernest Series

The Ernest series consists of deep, moderately well drained soils on foot slopes, mostly in Hampshire and Mineral Counties. The soils formed in acid material that moved downslope from soils that are underlain by shale, siltstone, and sandstone. Slopes range from 3 to 15 percent.

In a representative profile the surface layer is dark yellowish-brown silt loam about 6 inches thick. The subsoil is about 40 inches thick. The upper 6 inches is yellowish-brown, friable, heavy silt loam, and the next 16 inches is yellowish-brown, firm silty clay loam mottled with grayish brown and light brownish gray. The lower part is a very firm, brittle fragipan that is brown shaly clay loam mottled with yellowish brown and brown. Shale bedrock is at a depth of 46 inches.

Ernest soils have moderate available water capacity and low to moderate natural fertility.

Permeability is moderately slow in the lower part of the subsoil and moderate in the upper part. Available water capacity is moderate. The seasonal high water table is at a depth of 1½ to 2½ feet. Natural fertility is low to moderate.

The nonstony Ernest soils are suited to crops com-

monly grown in the survey area. The fragipan in the subsoil restricts root development and movement of water through the soil, and the growth of deep-rooted legumes, such as alfalfa, is affected in places. The areas of nonstony soils are more than 50 percent cleared and are used mainly for pasture or hay. Most areas of very stony soils are wooded. The seasonal high water table, moderately slow permeability, steepness of slope, and stoniness are the main limitations to use of these soils for septic tank absorption fields and roads and streets.

Representative profile of Ernest silt loam, 8 to 15 percent slopes, in an abandoned meadow, 200 yards north of Trinity Church, 150 feet southeast of U.S. Highway 220 at Junction, in Hampshire County:

Ap—0 to 6 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine and medium, granular structure; friable; many roots; 5 percent coarse fragments; medium acid; clear, smooth boundary.

B1t—6 to 12 inches, yellowish-brown (10YR 5/4) heavy silt loam; moderate, medium, subangular blocky structure; friable; many roots; few discontinuous clay films on faces of peds; 5 percent coarse fragments; strongly acid; gradual, wavy boundary.

B21t—12 to 17 inches, yellowish-brown (10YR 5/6) silty clay loam; few, fine, faint, grayish-brown (10YR 5/2) mottles at a depth of 15 inches; strong, medium and coarse, subangular blocky structure; firm; many roots; few discontinuous clay films on faces of peds; 5 percent coarse fragments; strongly acid; gradual, wavy boundary.

B22t—17 to 28 inches, yellowish-brown (10YR 5/6) silty clay loam; common, medium, faint, grayish-brown (10YR 5/2) and light brownish-gray (10YR 6/2) mottles; weak, fine, subangular blocky structure; firm; few roots; common continuous clay films on faces of peds; 10 percent coarse fragments; strongly acid; gradual, wavy boundary.

Bx1—28 to 38 inches, brown (10YR 5/3) shaly clay loam; many, medium, distinct, yellowish-brown (10YR 5/8) and brown (7.5YR 5/2) mottles; moderate, very coarse, prismatic structure parting to weak, coarse, subangular blocky; very firm and brittle; few black concretions; common continuous clay films on faces of prisms; 20 percent coarse fragments; strongly acid; gradual, wavy boundary.

Bx2—38 to 46 inches, brown (10YR 5/3) shaly clay loam; many, coarse, faint, gray (10YR 6/1) and yellowish-brown (10YR 5/8) mottles; weak, very coarse, prismatic structure; very firm and brittle; common discontinuous clay films on faces of prisms; 45 percent coarse fragments; strongly acid; clear, wavy boundary.

R—46 inches, olive-brown (2.5YR 4/4) shale.

The solum, including the fragipan, is 36 to 50 inches thick. Depth to bedrock is more than 3½ feet. Coarse fragments make up 5 to 20 percent of the Bt horizon and as much as 45 percent of the Bx and C horizons. In unlimed areas the profile is very strongly acid to strongly acid throughout.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or very stony silt loam. The Bt and Bx horizons have hue of 10YR, value of 4 to 6, and chroma of 3 to 6. The Bt horizon is silty clay loam or silt loam, and the Bx horizon is clay loam, silt loam, silty clay loam, or their shaly analogs. The Bt and Bx horizons have mottles of high and low chroma.

Ernest soils are near well-drained Laidig soils, moderately well drained Buchanan soils, and poorly drained Andover and Brinkerton soils. They are not so well drained as Laidig soils and are better drained than Andover and Brinkerton soils. Ernest soils have finer textured A and B horizons than Andover, Buchanan, or Laidig soils. They are more acid in the lower part of the profile than Brinkerton soils.

Ernest silt loam, 3 to 8 percent slopes (ErB).—This soil is on the lower parts of foot slopes around narrow drainageways and on some alluvial-colluvial fans. It has a profile similar to the one described as representative of the series, but it is less sloping. Seep spots are common in some areas. Included in mapping are a few small areas of Brinkerton soils, a few small areas of soils that are less sloping than this soil, a few areas of soils that have a channery or shaly surface layer, and a few small, narrow areas of Fluvaquents along drainageways.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions help to intercept water received from upslope areas. In places, areas in which seep spots occur need to be drained. Capability unit IIe–13; woodland suitability subclass 3w.

Ernest silt loam, 8 to 15 percent slopes (ErC).—This soil is mostly on the upper part of foot slopes and along drainageways. It has the profile described as representative of the series. Seep spots are common in some areas. Included in mapping are a few small areas of Brinkerton and Rushtown soils, a few small areas of soils that have a channery or shaly surface layer, a few severely eroded areas, and a few stony areas.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions help to control soil and water losses on long slopes. In places, areas in which seep spots occur need to be drained. Capability unit IIIe–13; woodland suitability subclass 3w.

Ernest very stony silt loam (Es).—This soil is on the Allegheny Plateau. It is on foot slopes and benches and along drainageways. It has a profile similar to the one described as representative of the series, but it has a very stony surface. Included in mapping are a few small areas of Gilpin soils, a few small areas of soils that are extremely stony, and a few areas of very stony, poorly drained soils.

This very stony soil is not suited to crops and hay but is suited to pasture. The hazard of erosion is moderate in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The very stony surface restricts the use of farm machinery. Capability unit VIs–2; woodland suitability subclass 2w.

Fluvaquents

Fluvaquents (FA) are deep to shallow, very poorly drained, poorly drained, and somewhat poorly drained soils of the flood plain. They are along the lower

reaches of many streams in the survey area, where the flood plain widens. The soils formed in stratified, moderately fine to coarse textured alluvial material. Slopes range from 0 to 5 percent.

Fluvaquents formed in stratified materials ranging mostly from black to grayish brown in the surface layer and from dark gray to yellowish brown with high- and low-chroma mottles in the underlying horizons. The texture ranges from light silty clay loam to sand. Gravel strata also occur.

The surface of these soils is irregular because of periodic cutting of new stream channels, deposition of coarse material and gravel in the low ridges between the abandoned channels, and partial filling of the abandoned channels with finer material.

Included with these soils in mapping are areas of moderately well drained, well drained, and excessively drained soils.

Fluvaquents are frequently flooded. Permeability, available water capacity, and depth to seasonal high water table are variable. They have a wide range of natural fertility.

Fluvaquents are suited to pasture and trees. The irregular surface and the generally poor drainage make it difficult to use farm machinery on these soils. In some areas the seasonal high water table and poor drainage make it necessary to delay grazing to avoid undue soil compaction and loss of tilth. Frequent flooding and a seasonal high water table are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets. Capability unit VIw–1; woodland suitability subclass 2w.

Gilpin Series

The Gilpin series consists of moderately deep, well-drained soils, mostly on the Allegheny Plateau uplands in the western part of Mineral County. The soils formed in acid material weathered from shale, siltstone, and sandstone. Slopes range from 3 to 65 percent.

In a representative profile the surface layer is 3 inches of dark-brown silt loam over 3 inches of grayish-brown silt loam. The yellowish-brown subsoil is 19 inches thick. The upper 4 inches is friable silt loam; the next 12 inches is firm light silty clay loam; and the lower 3 inches is very firm shaly light silty clay loam. The substratum extends to a depth of 30 inches. It is yellowish-brown very shaly silt loam underlain by shale bedrock.

Permeability is moderate throughout. Available water capacity is moderate. Natural fertility is low.

The gently sloping, strongly sloping, and moderately steep, nonstony Gilpin soils are suited to crops commonly grown in the survey area. Most of these areas are cleared and are used mainly for hay and pasture. Most areas of steep and very steep, nonstony soils and extremely stony soils are wooded. Limited depth to bedrock and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Gilpin silt loam, 3 to 8 percent slopes, in a wooded area along State Route 4, known as Pinnacle Road, about 1 mile south of its junction with State Route 3, in Mineral County:

A1—0 to 3 inches, dark-brown (10YR 3/3) silt loam; moderate, fine and medium, granular structure; loose; common roots; strongly acid; clear, smooth boundary.

A2—3 to 6 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; very friable; common roots; 5 percent coarse fragments; strongly acid; clear, smooth boundary.

B1—6 to 10 inches, yellowish-brown (10YR 5/6) silt loam; weak and moderate, fine, subangular blocky structure; friable; common roots; 5 percent coarse fragments; strongly acid; clear, smooth boundary.

B2t—10 to 22 inches, yellowish-brown (10YR 5/6) light silty clay loam; moderate, medium, subangular blocky structure; firm; common roots; common discontinuous clay films on faces of peds; 10 percent coarse fragments; strongly acid; gradual, wavy boundary.

B3t—22 to 25 inches, yellowish-brown (10YR 5/6) shaly light silty clay loam; weak, medium, subangular blocky structure; very firm; common roots; few discontinuous clay films on faces of peds; 40 percent coarse fragments; strongly acid; gradual, wavy boundary.

C—25 to 30 inches, yellowish-brown (10YR 5/6) very shaly silt loam; massive; firm; 70 percent coarse fragments; strongly acid; clear, wavy boundary.

R—30 inches, shale bedrock.

The solum is 20 to 30 inches thick. Depth to bedrock is 20 to 40 inches. Coarse fragments make up 5 to 40 percent of individual layers in the A and B horizons and 40 to 90 percent of the C horizon. In unlimed areas the profile is very strongly acid to strongly acid throughout.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is silt loam or extremely stony silt loam. The B horizon has hue of 10YR, value of 5, and chroma of 4 to 8 or hue of 7.5YR, value of 5, and chroma of 6 or 8. It is silt loam, light silty clay loam, or their shaly analogs. The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 8. It is shaly or channery silt loam and loam.

Gilpin soils are near the well drained Berks soils and the moderately well drained Wharton soils. They have a finer textured B horizon, and their A and B horizons contain fewer coarse fragments than those of Berks soils. They are better drained and shallower than Wharton soils, and they generally have a coarser textured B horizon. Gilpin soils are shallower than Murrill soils and Murrill variant soils, and their A horizon and the upper part of their B horizon are finer textured than the ones of those soils. In addition, the lower part of the B horizon of Gilpin soils is not so red as that of Murrill soils and Murrill variant soils, and it is coarser textured and contains more coarse fragments.

Gilpin silt loam, 3 to 8 percent slopes (GlB).—This soil is mostly on low hills and ridgetops. It has the profile described as representative of the series. Included in mapping are a few small areas of coarser textured soils, a few areas of deeper soils, and a few areas in which sinks are above old coal mines.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe-10; woodland suitability subclass 2o.

Gilpin silt loam, 8 to 15 percent slopes (GlC).—This soil is on the top of hills and ridges and on smooth upper side slopes. It has a profile similar to the one described as representative of the series but it is

steeper and generally has a thinner subsoil. Included in mapping are a few areas of coarser textured soils and a few areas in which sinks are above old coal mines (fig. 4).

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Crop growth is better where these soils occur on the Allegheny Plateau than in other areas because of the higher rainfall. Capability unit IIIe–10; woodland suitability subclass 2o.

Gilpin silt loam, 15 to 25 percent slopes (GlD).—This soil is mostly near the top of ridges. It has a profile similar to the one described as representative of the series, but it is steeper and shallower. Included in mapping are a few small areas of stony soils and a few areas in which sinks are above old coal mines.

This soil has limited suitability for crops and is better suited to hay and pasture. Many formerly cropped areas have reverted to trees. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe-3; woodland suitability subclass—north aspect 2r, south aspect 3r.

Gilpin silt loam, 25 to 35 percent slopes (GlE).—This soil is on long, smooth side slopes, generally on the middle and upper half of the hillside. It has a profile similar to the one described as representative of the series, but it is steeper and generally shallower. Included in mapping are a few small areas of Ernest soils, a few small areas of soils that are extremely stony, a few areas of soils that are steeper than this soil, and a few areas in which sinks are above old coal mines.

This soil is not suited to crops but is suited to pasture or trees. Many formerly cropped areas have reverted to trees. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper

Figure 4.—Area of Gilpin silt loam, 8 to 15 percent slopes, in which sinks have developed over old coal mines.

stocking, help to control soil and water losses and to maintain fertility. Capability unit VIe–2; woodland suitability subclass—north aspect 2r, south aspect 3r.

Gilpin extremely stony silt loam, 3 to 15 percent slopes (GmC).—This soil is on the broader ridges of the Allegheny Plateau. It has a profile similar to the one described as representative of the series, but it is steeper and has an extremely stony surface layer. Included in mapping are a few small areas of Brinkerton and Wharton soils and a few small areas in which sinks are above old coal mines.

This soil is not suited to crops, hay, and pasture, because of its extremely stony surface. It is better suited to trees and to wildlife habitat than to other purposes. The extremely stony surface moderately limits the use of woodland equipment. Capability unit VIIs–4; woodland suitability subclass 2x.

Gilpin extremely stony silt loam, 25 to 65 percent slopes (GmF).—This soil is along the sides of hills and mountains on the Allegheny Plateau, mainly along the North Branch Potomac River. It has a profile similar to the one described as representative of the series, but it is steeper and generally shallower, and it has an extremely stony surface. Included in mapping are a few small areas of Dekalb soils and Typic Dystrochrepts, stony. Also included are a few small areas in which sinks are above old coal mines.

This soil is not suited to crops, hay, and pasture because of its extremely stony surface. It is better suited to trees and to wildlife habitat than to other purposes. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIs–4; woodland suitability subclass—north aspect 2x, south aspect 3x.

Huntington Series

The Huntington series consists of deep, well-drained soils on flood plains, mostly along the South Branch Potomac River, Potomac River, and Pattersons Creek. The soils formed in limy alluvial material washed mainly from lime-influenced soils on uplands. Huntington soils are subject to flooding. Slopes range from 0 to 3 percent.

In a representative profile the surface layer is dark-brown loam about 12 inches thick. The dark-brown subsoil extends to a depth of 52 inches. The upper 6 inches is friable heavy loam, and the lower 34 inches is friable silt loam. The substratum extends to a depth of 64 inches or more. It is stratified silt loam, sandy loam, and sandy clay loam.

Permeability is moderate in the subsoil. Available water capacity is high. Natural fertility is high.

These soils are suited to crops commonly grown in the survey area. Most areas are cleared and are used mainly for crops or hay. The hazard of flooding is the main limitation to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Huntington loam, in a hayfield 200 yards north of Romney water plant, 200 feet east of river, in Hampshire County:

Ap—0 to 12 inches, dark-brown (7.5YR 3/2) loam; moderate, medium, granular structure; friable; many roots; medium acid; abrupt, smooth boundary.

B1—12 to 18 inches, dark-brown (7.5YR 3/2) heavy loam; weak, fine, subangular blocky structure; friable; many roots; slightly acid; clear, wavy boundary.

B2—18 to 52 inches, dark-brown (10YR 4/3) silt loam; dark grayish brown (10YR 4/2) on faces of peds; moderate, medium, subangular blocky structure; friable; few roots; slightly acid; clear, wavy boundary.

C—52 to 64 inches +, yellowish-brown (10YR 5/6), brown (7.5YR 5/4), and yellowish-red (5YR 4/6) stratified silt loam, sandy loam, and sandy clay loam; few, faint, grayish-brown (10YR 5/2) mottles; massive; slightly acid.

Depth to stratified material is more than 40 inches. In unlimed areas the soil is medium acid to neutral throughout.

The Ap and B1 horizons have hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. The B2 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or light silty clay loam.

Huntington soils are near the well drained Chagrin soils, the moderately well drained Lindside soils, the poorly drained Melvin soils, and the poorly drained and very poorly drained Dunning soils. They are better drained than any of those soils except Chagrin soils and have a darker A horizon than any except Dunning soils. Their A and B horizons are finer textured than those of Chagrin soils and coarser textured than those of Dunning soils.

Huntington loam (Hu).—This nearly level soil is on flood plains. Included in mapping are a few small areas of Chagrin and Lindside soils and a few small areas of soils that have a surface layer of silt loam.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. Crops can be grown year after year, but the areas need the protection of a cover crop. Working a cover crop into the soil helps to maintain tilth and fertility. This soil is subject to occasional flooding. Capability unit I–6; woodland suitability subclass 1o.

Laidig Series

The Laidig series consists of deep, well-drained soils on foot slopes in areas scattered throughout the survey area. The soils formed in acid colluvial material that moved downslope from soils that are underlain by sandstone, siltstone, and shale. Slopes range from 3 to 35 percent.

In a representative profile the surface layer is 1 inch of black loam over 7 inches of light yellowish-brown loam. The subsoil extends to a depth of 62 inches or more. The upper 5 inches is yellowish-brown, friable loam; the next 9 inches is yellowish-brown light sandy clay loam; and the next 14 inches is yellowish-brown, friable channery light sandy clay loam. The lower part is a brittle fragipan that is yellowish-brown. The upper 6 inches is firm channery light sandy clay loam mottled with light gray. The lower 20 inches or more is yellowish-brown, very firm channery sandy loam mottled with light gray.

Permeability is moderately slow in the lower part of the subsoil and moderate in the upper part. Available water capacity is moderate. Natural fertility is low to moderate.

The nonstony Laidig soils are suited to crops commonly grown in the survey area, and more than 50 percent of the acreage is cleared and used mainly for pasture or hay. Most areas of very stony and extremely stony soils are wooded. Steepness of slope is the main

limitation to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Laidig very stony loam, 3 to 15 percent slopes, in woodland about 435 yards northwest of Meadow Run in curve along entrance road to Short Mountain Public Hunting Area, Hampshire County:

A1—0 to 1 inch, black (10YR 2/1) loam; weak, fine, granular structure; loose; many roots; 25 percent coarse fragments; very strongly acid; clear, smooth boundary.

A2—1 to 8 inches, light yellowish-brown (10YR 6/4) loam; weak, medium and coarse, granular structure; very friable; many roots; 20 percent coarse fragments; very strongly acid; clear, smooth boundary.

B1—8 to 13 inches, yellowish-brown (10YR 5/4) loam; weak, medium and coarse, subangular blocky structure; friable; many roots; 15 percent coarse fragments; very strongly acid; clear, smooth boundary.

B21t—13 to 22 inches, yellowish-brown (10YR 5/6) light sandy clay loam; moderate, fine, subangular blocky structure; friable; common roots; few discontinuous clay films on faces of peds; 10 percent coarse fragments; very strongly acid; clear, smooth boundary.

B22t—22 to 36 inches, yellowish-brown (10YR 5/6) channery light sandy clay loam; few, medium, distinct, dark-brown (7.5YR 4/4) mottles at a depth of 32 inches; moderate, fine and medium, subangular blocky structure; friable; common roots; common, discontinuous, light yellowish-brown clay films on faces of peds; 50 percent coarse fragments; very strongly acid; clear, wavy boundary.

Bx1—36 to 42 inches, yellowish-brown (10YR 5/6) channery light sandy clay loam; many, medium, faint, light-gray (10YR 7/2) mottles; strong, very coarse, prismatic structure parting to weak, fine, subangular blocky; firm and brittle; few, discontinuous, light-gray clay films on faces of peds; 30 percent coarse fragments; very strongly acid; clear, smooth boundary.

Bx2—42 to 62 inches +, yellowish-brown (10YR 5/6) channery sandy loam; many, medium, faint, light-gray (10YR 7/2) mottles; weak, very coarse, prismatic structure; very firm and brittle; few discontinuous clay films on faces of peds; 40 percent coarse fragments; very strongly acid.

The solum is more than 60 inches thick. Depth to the fragipan is 30 to 44 inches. Depth to bedrock is more than 5 feet. Coarse fragments make up 10 to 50 percent of individual layers of the A and B horizons and 30 to 70 percent of the Bx horizon. In unlimed areas the profile is strongly acid to extremely acid throughout.

The A horizon has hue of 10YR or 7.5YR; the A1 horizon has value of 2 or 3 and chroma of 1 or 2, the A2 horizon has value of 5 or 6 and chroma of 2 to 6, and the Ap horizon has value of 4 or 5 and chroma of 2 to 4. The A horizon is clay loam or very stony loam. The B1 and B2t horizons have hue of 7.5YR, value of 4 or 5, and chroma of 4 or 6 or hue of 10YR, value of 5, and chroma of 4 or 6. They are sandy clay loam, silt loam, loam, sandy loam, or their channery analogs. The Bx horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. It is channery or very channery sandy clay loam, silt loam, or sandy loam.

Laidig soils are near the moderately well drained Buchanan and Ernest soils and the poorly drained Andover and Brinkerton soils. They are better drained than any of those soils. They have coarser textured A and B horizons than Ernest and Brinkerton soils and are more acid in the lower part of the profile than Brinkerton soils.

Laidig channery loam, 3 to 8 percent slopes (LaB).—This soil is mostly on the lower parts of long foot slopes. It has a profile similar to the one described as representative of the series, but it is less sloping, has a slightly thicker subsoil, and does not have a very stony surface. Included in mapping are a few small areas of Andover and Brinkerton soils and a few small areas of soils that are less sloping than this soil.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions help to intercept water received from upslope areas. Capability unit IIe–4; woodland suitability subclass 3o.

Laidig channery loam, 8 to 15 percent slopes (LaC).—This soil is mostly on the middle and upper parts of long foot slopes and along narrow foot slopes. It has a profile similar to the one described as representative of the series, but it does not have a very stony surface. Included in mapping are a few small areas of Buchanan and Dekalb soils, a few small areas of soils that are sand or loamy sand throughout, and a few areas of soils that have a reddish profile.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–4; woodland suitability subclass 3o.

Laidig channery loam, 15 to 25 percent slopes (LaD).—This soil is mostly on the upper part of long foot slopes and along drainageways. It has a profile similar to the one described as representative of the series, but it has a slightly thinner subsoil and does not have a very stony surface. Included in mapping are a few small areas of Buchanan, Dekalb, and Schaffenaker soils and a few small areas of soils that have a reddish profile.

This soil has limited suitability for crops; it is better suited to hay and pasture than other purposes. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–3; woodland suitability subclass 3r.

Laidig very stony loam, 3 to 15 percent slopes (LbC).—This soil is mostly on the lower part of long foot slopes. It has the profile described as representative of the series. Included in mapping are a few small areas of Andover, Buchanan, Brinkerton, Dekalb, and Schaffenaker soils, a few small areas of soils that have an extremely stony surface, and a few areas of soils that have a reddish profile.

This very stony soil is unsuited to crops and hay but is suited to pasture. The hazard of erosion is moderate to severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water

losses and to maintain fertility. The very stony surface restricts the use of farm machinery. Capability unit VIs–2; woodland suitability subclass 3o.

Laidig very stony loam, 15 to 25 percent slopes (LbD).—This soil is mostly on the middle and upper parts of long foot slopes and along drainageways. It has a profile similar to the one described as representative of the series, but it is steeper and has a thinner subsoil. Included in mapping are a few small areas of Buchanan, Dekalb, and Schaffenaker soils; a few small areas of soils that have an extremely stony surface; and a few areas of soils that have a reddish profile.

This very stony soil is unsuited to crops and hay but is suited to pasture. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The very stony surface restricts the use of farm machinery. Capability unit VIs–2; woodland suitability subclass 3r.

Laidig extremely stony loam, 25 to 35 percent slopes (LcE).—This soil is along the lower slopes of mountains. The largest area is on the lower western slope of New Creek Mountain near The Saddle. Included in mapping are a few small areas of Dekalb soils and Typic Dystrochrepts, stony.

This soil is unsuited to crops, hay, and pasture because of its extremely stony surface. It is better suited to trees and to wildlife habitat than to other purposes. The extremely stony surface severely limits the use of woodland equipment. Capability unit VIIs–4; woodland suitability subclass 3x.

Lehew Series

The Lehew series consists of moderately deep, well-drained soils on uplands, mostly along the east-facing slopes of Allegheny Front Mountain and in areas scattered throughout Hampshire and Morgan Counties. The soils formed in acid material weathered mainly from red sandstone but partly from siltstone and shale. Slopes range from 3 to 65 percent.

In a representative profile the surface layer is 1 inch of dark-gray channery fine sandy loam over 5 inches of reddish-brown channery fine sandy loam. The subsoil is reddish-brown, friable channery fine sandy loam about 14 inches thick. The substratum extends to a depth of 32 inches. It is reddish-brown very channery fine sandy loam underlain by reddish sandstone bedrock.

Permeability is moderately rapid throughout. Available water capacity is low to very low. Natural fertility is low.

The gently sloping, strongly sloping, and moderately steep, nonstony Lehew soils are suited to most crops commonly grown in the survey area. Most of these areas are cleared and are used mainly for pasture, hay, or orchards. The areas of steep and very steep, nonstony Lehew soils and the areas of very stony Lehew soils are mostly wooded.

The very stony Lehew soils are mapped in undifferentiated soil groups with Dekalb soils and are described with the Dekalb series.

Lehew soils are droughty, and special management is needed to limit soil and water losses and to maintain fertility and good tilth. In areas where Lehew soils are underlain by folded bedrock, fractures and cracks that have formed provide a good rooting zone for fruit trees. The limited depth to bedrock and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Lehew channery fine sandy loam, 25 to 35 percent slopes, in a pasture, about 3¾ miles northeast of Augusta, along State Route 45/13, ¾ mile southeast of intersection with State Route 45, in Hampshire County:

A1—0 to 1 inch, dark-gray (10YR 4/1) channery fine sandy loam; weak, fine, granular structure; soft, very friable, and nonsticky; many roots; 20 percent coarse fragments; strongly acid; clear, smooth boundary.

A2—1 to 6 inches, reddish-brown (5YR 5/3) channery fine sandy loam; weak, fine and medium, granular structure; soft, friable, and nonsticky; common roots; 20 percent coarse fragments; strongly acid; gradual, wavy boundary.

B1—6 to 9 inches, reddish-brown (5YR 4/4) channery fine sandy loam; weak, fine, subangular blocky structure; soft, friable, and slightly sticky; common roots; 25 percent coarse fragments; strongly acid; gradual, wavy boundary.

B2—9 to 20 inches, reddish-brown (2.5YR 4/4) channery fine sandy loam; moderate, medium, subangular blocky structure; slightly hard, friable, and slightly sticky; few, thin, discontinuous clay films; few roots; 35 percent coarse fragments; strongly acid; gradual, wavy boundary.

C—20 to 32 inches, reddish-brown (2.5YR 4/4) very channery fine sandy loam; massive with some tendency to platy; friable, slightly hard, and slightly sticky; 60 percent coarse fragments; strongly acid; abrupt, wavy boundary.

R—32 inches, weathered reddish sandstone.

The solum is 15 to 30 inches thick. Depth to bedrock ranges from 20 to 40 inches. Coarse fragments make up 25 to 50 percent of individual layers of the B horizon and as much as 80 percent of the C horizon. In unlimed areas the profile is very strongly acid to strongly acid throughout.

The A1 horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 1 or 2. The A2 horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 3 to 6. The Ap horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 or 4, and chroma of 2 to 4. It is channery fine sandy loam, flaggy fine sandy loam, or very stony sandy loam. The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 or 6. It is channery sandy loam, fine sandy loam, and loam. The C horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 2 to 4. It is channery or very channery loamy sand, sandy loam, and fine sandy loam.

Lehew soils are near the well-drained Berks, Calvin, and Dekalb soils. They have redder B and C horizons than Berks and Dekalb soils and are coarser textured throughout than Berks and Calvin soils.

Lehew channery fine sandy loam, 3 to 8 percent slopes (LeB).—This soil is mostly on broad ridgetops. It has a profile similar to the one described as representative for the series, but it is less sloping and slightly deeper, and it has fewer channery coarse fragments on its surface. Included in mapping are a few small areas of Dekalb, Berks, and Calvin soils, a few small areas of soils that are less sloping than this soil, and a few areas of soils that have a nonchannery surface layer.

This soil is suited to crops commonly grown in the

survey area and to hay and pasture. On Jersey Mountain in Hampshire County, the bedrock under this soil is fractured, creating good rooting conditions for fruit trees. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe–12; woodland suitability subclass 4f.

Lehew channery fine sandy loam, 3 to 8 percent slopes, severely eroded (LeB3) —This soil is mostly on eroded ridgetops. It has a profile similar to the one described as representative of the series, but it is less sloping. Also, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Dekalb, Berks, and Calvin soils and a few areas of soils that have a flaggy surface layer.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. On Jersey Mountain in Hampshire County, the bedrock under this soil is fractured, creating good rooting conditions for fruit trees. The hazard of erosion is severe in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–12; woodland suitability subclass 4f.

Lehew channery fine sandy loam, 8 to 15 percent slopes (LeC).—This soil is mostly on rounded ridgetops and long narrow benches. It has a profile similar to the one described as representative of the series, but it is less sloping and deeper, and it generally has fewer channery coarse fragments on its surface. Included in mapping are a few small areas of Dekalb, Berks, and Calvin soils and a few narrow areas of Fluvaquents along drainageways.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. On Jersey Mountain in Hampshire County, the bedrock under this soil is fractured, creating good rooting conditions for fruit trees. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–12; woodland suitability subclass 4f.

Lehew channery fine sandy loam, 8 to 15 percent slopes, severely eroded (LeC3).—This soil is on rounded ridgetops and foothills. It has a profile similar to the one described as representative of the series, but it is less sloping, and it generally has more coarse fragments in its surface layer. In addition, erosion has removed most of the surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Dekalb, Berks, and Calvin soils, a few small areas of soils that have a flaggy surface layer, and a few narrow areas of Fluvaquents along small drainageways.

This soil has limited suitability for crops and is better suited to hay and pasture. On Jersey Mountain in Hampshire County, the bedrock under this soil is fractured, creating good rooting conditions for fruit trees. The hazard of erosion is very severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, and including hay in the cropping system are practices that help to control further erosion and to maintain fertility and good tilth. Capability unit IVe–5; woodland suitability subclass 4f.

Lehew channery fine sandy loam, 15 to 25 percent slopes (LeD) —This soil is in areas between benches and on rounded foothills. It has a profile similar to the one described as representative of the series, but it is less sloping and slightly deeper. Included in mapping are a few small areas of Dekalb, Berks, and Calvin soils and a few narrow areas of Fluvaquents along drainageways.

This soil has limited suitability for crops and is better suited to hay and pasture. On Jersey Mountain in Hampshire County, the bedrock under this soil is fractured, creating good rooting conditions for fruit trees. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–5; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew channery fine sandy loam, 15 to 25 percent slopes, severely eroded (LeD3).—This soil is mostly on the sides of rounded foothills. It has a profile similar to the one described as representative of the series, but it is less sloping, and it has more coarse fragments in its surface layer. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Gullies are in some areas. Included in mapping are a few small areas of Dekalb, Berks, and Calvin soils, a few small areas of soils that have a flaggy surface layer, and a few narrow areas of Fluvaquents along drainageways.

This soil is unsuited to crops but is suited to pasture or trees. On Jersey Mountain in Hampshire County, the bedrock under this soil is fractured, creating good rooting conditions for fruit trees. The hazard of erosion is very severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew channery fine sandy loam, 25 to 35 percent slopes (LeE).—This soil is mostly on the sides of hills and mountains. It has the profile described as representative for the series. A few rock outcrops are in some areas. Included in mapping are a few small areas of Dekalb, Berks, and Calvin soils, a few small areas of soils that are severely eroded, and a few narrow areas of Fluvaquents along small drainageways.

This soil has limited suitability for pasture and is better suited to trees and to wildlife habitat. The hazard of erosion is severe in unprotected areas. Good

pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Steepness of slope moderately limits the use of woodland equipment. Capability unit VIIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew channery fine sandy loam, 35 to 65 percent slopes (LeF).—This soil is on hogbacks and mountainsides. It has a profile similar to the one described as representative of the series, but it is steeper and generally shallower. Occasional rock outcrops are in some areas. Included in mapping are a few small areas of Dekalb, Berks, and Calvin soils, a few small areas of soils that are severely eroded, a few areas of soils that have a flaggy surface layer, and a few narrow areas of Fluvaquents along drainageways.

This soil is unsuited to crops, hay, and pasture because of its very steep slopes. It is better suited to trees and to wildlife habitat than to other purposes. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew-Berks complex, 3 to 8 percent slopes (LkB).—This complex is mostly on broad ridges and narrow benches. About 50 percent of the acreage of this mapping unit is Lehew channery fine sandy loam, about 30 percent is Berks channery silt loam, and about 20 percent is less extensive soils. The soils have a profile similar to the one described as representative of their respective series, but they are deeper and less sloping. Included in mapping are a few small areas of Calvin and Dekalb soils and a few areas of soils that are less sloping than these soils.

These soils are suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe–12; woodland suitability subclass 4f.

Lehew-Berks complex, 3 to 8 percent slopes, severely eroded (LkB3).—These soils are mostly on broad ridgetops and narrow benches. About 50 percent of the complex is Lehew channery fine sandy loam, about 30 percent is Berks channery silt loam, and about 20 percent is less extensive soils. The soils have a profile similar to the one described as representative of their respective series, but more coarse fragments are generally in the surface layer. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Dekalb and Calvin soils.

These soils are suited to crops commonly grown in the survey area and to hay and pasture. Many formerly cropped areas have reverted to trees; Virginia pine is the common species. The hazard of erosion is very severe in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control further erosion and to maintain fertility and good tilth. Capability unit IIIe–12; woodland suitability subclass 4f.

Lehew-Berks complex, 8 to 15 percent slopes (LkC).—These soils are on rounded hilltops, ridges, and narrow benches. About 50 percent of this complex is Lehew channery fine sandy loam, about 30 percent is Berks channery silt loam, and about 20 percent is less extensive soils. The soils have a profile similar to the one described as representative of their respective series, but they are less sloping and slightly deeper. Included in mapping are a few small areas of Dekalb and Calvin soils and a few narrow areas of Fluvaquents along small drainageways.

These soils are suited to crops, hay, and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–12; woodland suitability subclass 4f.

Lehew-Berks complex, 8 to 15 percent slopes, severely eroded (LkC3).—These soils are on rounded hilltops and ridges and narrow benches. About 50 percent of this complex is Lehew channery fine sandy loam, about 30 percent is Berks channery silt loam, and about 20 percent is less extensive soils. The soils have a profile similar to the one described as representative of their respective series, but they are less sloping, and they generally have more coarse fragments in the surface layer. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Dekalb and Calvin soils and narrow areas of Fluvaquents along small drainageways.

These soils have limited suitability for crops; they are better suited to hay and pasture. The hazard of erosion is very severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control further erosion and to maintain fertility and good tilth. Capability unit IVe–5; woodland suitability subclass 4f.

Lehew-Berks complex, 15 to 25 percent slopes (LkD).—These soils are on the sides of foothills and lower mountain slopes. About 50 percent of this complex is Lehew channery fine sandy loam, about 30 percent is Berks channery silt loam, and about 20 percent is less extensive soils. The soils have a profile similar to the one described as representative of their respective series, but they are less sloping and slightly deeper. Included in mapping are a few small areas of Dekalb and Calvin soils and a few narrow areas of Fluvaquents along small drainageways.

These soils have limited suitability for crops; they are better suited to hay and pasture. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good

tilth. Capability unit IVe–5; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew-Berks complex, 15 to 25 percent slopes, severely eroded (LkD3).—These soils are on the sides of foothills and lower mountain slopes. About 50 percent of this complex is Lehew channery fine sandy loam, about 30 percent is Berks channery silt loam, and about 20 percent is less extensive soils. The soils have a profile similar to the one described as representative of their respective series, but they are less sloping and generally have more coarse fragments in their surface layers. In addition, erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Dekalb and Calvin soils, a few areas that are flaggy, a few areas that are very stony, and a few narrow areas of Fluvaquents along small drainageways.

These soils are not suited to crops but are suited to pasture or trees. The hazard of erosion is very severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew-Berks complex, 25 to 35 percent slopes (LkE).—These soils are on the sides of hills and mountains. About 55 percent of this mapping unit is Lehew channery fine sandy loam, about 25 percent is Berks channery silt loam, and about 20 percent is less extensive soils. The soils have a profile similar to that described as representative of their respective series. Included in mapping are a few small areas of Dekalb and Calvin soils, a few small areas of soils that are severely eroded, a few areas that are flaggy, a few areas that are stony, and a few narrow areas of Fluvaquents along small drainageways.

These soils have limited suitability for pasture; they are better suited to trees and to wildlife habitat. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The steepness of slope moderately limits the use of woodland equipment. Capability unit VIIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew-Berks complex, 35 to 65 percent slopes (LkF).—These soils are mostly on north-facing sides of hills and mountains. About 55 percent of this complex is Lehew channery fine sandy loam, about 25 percent is Berks channery silt loam, and about 20 percent is less extensive soils. The soils have a profile similar to the one described as representative of their respective series, but they are slightly shallower. Included in mapping are a few small areas of Calvin and Dekalb soils, a few small areas of soils that are severely eroded, a few areas of soils that are flaggy, and a few areas that are very stony.

These soils are not suited to crops, hay, and pasture because of their very steep slopes and severe hazard of erosion in unprotected areas. They are better suited to trees and to wildlife habitat than to other uses. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew-Dekalb flaggy fine sandy loams, 8 to 15 percent slopes (LlC).—These soils are mostly on rounded ridgetops and long, narrow benches. About 45 percent of this complex is Lehew flaggy fine sandy loam, about 35 percent is Dekalb flaggy fine sandy loam, and about 20 percent is less extensive soils. The Lehew part of this complex has a profile similar to the one described as representative of the Lehew series, but it is less sloping and has larger coarse fragments in its surface layer. The Dekalb part has a profile similar to the one described as representative of the Dekalb series, but it does not have a very stony surface and has a flaggy surface layer. Included in mapping are a few small areas of soils that are less sloping than these soils, a few areas that are severely eroded, and a few areas that are very stony.

These soils are suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–12; woodland suitability subclass 4f.

Lehew-Dekalb flaggy fine sandy loams, 15 to 25 percent slopes (LlD).—These soils are near the top of rounded foothills and on long mountain slopes. About 45 percent of this complex is Lehew flaggy fine sandy loam, about 35 percent is Dekalb flaggy fine sandy loam, and about 20 percent is less extensive soils. The Lehew part of this complex has a profile similar to the one described as representative for the Lehew series, but it is sloping and has larger coarse fragments in its surface layer. The Dekalb part has a profile similar to the one described as representative of the Dekalb series, but it is steeper and shallower, does not have a very stony surface, and has a flaggy surface layer. Included in mapping are a few small areas of soils that are severely eroded and a few areas that are stony.

These soils have limited suitability for crops; they are better suited to hay and pasture. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–5; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew-Dekalb flaggy fine sandy loams, 25 to 35 percent slopes (LlE).—These soils are on the sides of steep hills and mountains. About 60 percent of this complex is Lehew flaggy fine sandy loam, about 30 percent is Dekalb flaggy fine sandy loam, and about 20 percent is less extensive soils. The Lehew part of this complex has a profile similar to the one described as representative of the Lehew series, but it has larger coarse fragments in its surface layer. The Dekalb part has a profile similar to the one described as representative of the Dekalb series, but it is steeper and shallower,

does not have the very stony surface, and has a flaggy surface layer. Included in mapping are a few small areas of soil that are severely eroded and a few areas that are stony.

These soils have limited suitability for pasture; they are better suited to trees and to wildlife habitat than to other purposes. Many formerly cropped areas have reverted to trees. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The steep slopes moderately limit the use of woodland equipment. Capability unit VIIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lehew-Dekalb flaggy fine sandy loams, 35 to 65 percent slopes (LlF).—These soils are on long mountain slopes and short hill slopes between benches. About 60 percent of this complex is Lehew flaggy fine sandy loam, about 30 percent is Dekalb flaggy fine sandy loam, and about 10 percent is less extensive soils. The Lehew part of this complex has a profile similar to the one described as representative of the Lehew series, but it is steeper and shallower and has larger coarse fragments in its surface layer. The Dekalb part has a profile similar to the one described as representative of the Dekalb series, but it is steeper and shallower, does not have the very stony surface, and has a flaggy surface layer. Included in mapping are a few small areas of soils that are severely eroded and a few areas that are stony.

These soils are not suited to crops, hay, and pasture because of their very steep slopes. They are better suited to trees and to wildlife habitat than to other uses. Many formerly cropped areas have reverted to trees; Virginia pine is the common species. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIe–2; woodland suitability subclass—north aspect 4f, south aspect 5f.

Lindside Series

The Lindside series consists of deep, moderately well drained soils on flood plains, mostly along the South Branch Potomac River, Potomac River, and Pattersons Creek. The soils formed in limy alluvial material washed from lime-influenced soils on uplands. They are subject to flooding. Slopes range from 0 to 3 percent.

In a representative profile the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsoil is about 41 inches thick. The upper 8 inches is dark-brown, friable heavy silt loam; the next 15 inches is dark-brown, firm light silty clay loam mottled with yellowish brown and dark reddish brown; and the lower 18 inches is yellowish-brown, firm light silty clay loam mottled with light brownish gray and reddish brown. The substratum extends to a depth of 60 inches or more. It is dark yellowish-brown, stratified light silty clay loam, fine sandy loam, and silt loam mottled with grayish brown.

Permeability is moderate in the subsoil. Available water capacity is high. The seasonal high water table is at a depth of 1½ to 2 feet. Natural fertility is high.

Lindside soils are suited to crops commonly grown in the survey area. Most areas are cleared and are used mainly for crops and hay. Deep-rooted legumes, such as alfalfa, do not grow well on this moderately wet soil. The hazard of flooding and a seasonal high water table are the main limitations to use of these soils for homesites, septic tank absorption fields, and streets.

Representative profile of Lindside silt loam, in a meadow about 100 yards east of South Branch River, 1 mile north of Saw Mill Run and about 675 yards west-northwest of State Route 8, in Hampshire County:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; medium acid; clear, smooth boundary.

B1—7 to 15 inches, dark-brown (10YR 4/3) heavy silt loam; weak and moderate, fine, subangular blocky structure; friable; medium acid; clear, wavy boundary.

B2—15 to 30 inches, dark-brown (10YR 4/3) light silty clay loam; few, medium, distinct, yellowish-brown (10YR 5/6) and dark reddish-brown (5YR 2/2) mottles; moderate, fine, subangular blocky structure; firm; medium acid; clear, wavy boundary.

B3—30 to 48 inches, yellowish-brown (10YR 5/4) light silty clay loam; many, medium and coarse, distinct, light brownish-gray (10YR 6/2) and reddish-brown (5YR 4/3) mottles; moderate, fine, subangular blocky structure; firm; medium acid; clear, smooth boundary.

C—48 to 60 inches +, dark yellowish-brown (10YR 4/4) stratified light silty clay loam, fine sandy loam, and silt loam; many, medium, faint, grayish-brown (10YR 5/2) mottles; massive; medium acid.

The solum is 30 to 50 inches thick. Depth to bedrock is more than 5 feet. In unlimed areas the profile is medium acid to slightly acid throughout.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4 or hue of 7.5YR, value of 4 or 5, and chroma of 4. It is silt loam or light silty clay loam. The B and C horizons have mottles of high and low chroma.

Lindside soils are near the well-drained Chagrin and Huntington soils, the poorly drained Melvin soils, and the poorly drained and very poorly drained Dunning soils. Lindside soils are not so well drained as Chagrin and Huntington soils and are better drained than Melvin and Dunning soils. Their A and B horizons are finer textured than those of Chagrin soils and coarser textured than those of Dunning soils. Lindside soils have a lighter colored A horizon than Dunning and Huntington soils.

Lindside silt loam (Ln).—This soil is in long, narrow areas and small, irregularly shaped areas on flood plains. Included in mapping are a few small areas of Huntington and Melvin soils, a few small areas of soils that have a sandy loam surface layer, and a few areas of soils that have a very shaly surface layer.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. In places small wet areas need to be drained before desirable crops can be grown. The soil can be cropped year after year, but the areas need the protection of a cover crop. Working the residue of a cover crop into the soil improves tilth and fertility. Crops are likely to be damaged because of occasional flooding. Capability unit IIw–7; woodland suitability subclass 1w.

Lithic Udorthents

Lithic Udorthents consist of very shallow, excessively drained soils on uplands in the eastern part of Mineral County and throughout Hampshire and Morgan Coun-

ties. The soils formed in acid material weathered from shale and siltstone. The rates of soil formation and erosion appear to be in equilibrium. Slopes range from 8 to 70 percent.

Lithic Udorthents are mostly yellowish-brown extremely shaly silt loam underlain at a depth of 2 to 10 inches mainly by light olive-brown or yellowish-brown shale and siltstone bedrock.

Permeability is moderately rapid. Available water capacity is very low. Natural fertility is very low.

These soils are mapped only in a complex with areas of Rock outcrop.

Lithic Udorthents are very droughty. Trees grow poorly on these soils. Limited depth to bedrock and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Lithic Udorthents-Rock outcrop complex (LR).—This complex is mostly on steep and very steep sides of hills and mountains. It is about 50 percent Lithic Udorthents, 45 percent Rock outcrop, and 5 percent less extensive soils. Included in mapping are a few areas of Weikert soils.

This complex has limited suitability for wildlife habitat. The vegetation is mostly shrubs and pine trees of low quality that grow in cracks in and between layers of bedrock. Planting trees or shrubs is generally not feasible. Capability unit VIIIe–31; woodland suitability subclass 6d.

Melvin Series

The Melvin series consists of deep, poorly drained soils on flood plains, mostly along the South Branch Potomac River, Potomac River, and Pattersons Creek. The soils formed in limy alluvial material washed mainly from lime-influenced soils on uplands. They are subject to flooding. Slopes range from 0 to 3 percent.

In a representative profile the surface layer is 1 inch of very dark grayish-brown silt loam over 9 inches of grayish-brown silt loam mottled with light brownish gray and yellowish brown. The subsoil is light-gray, very firm light silty clay loam, about 14 inches thick, that is mottled with yellowish brown. The substratum extends to a depth of 50 inches or more. It is dark-gray, very firm light silty clay loam mottled with yellowish brown and grayish brown.

Permeability is moderately slow in the subsoil. Available water capacity is high. The seasonal high water table is at or near the surface. Natural fertility is moderate to high.

Drainage is needed before desirable crops can be grown on these soils. If the soils are drained, commonly grown crops, hay, and pasture plants that tolerate some wetness can be grown. Most areas are cleared and are used mainly for pasture or hay. The hazard of flooding and a seasonal high water table are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Melvin silt loam, in a pasture about 675 yards west of State Route 8 and about 675 yards north-northeast of mouth of Buffalo Run, in Hampshire County:

Ap1—0 to 1 inch, very dark grayish-brown (2.5Y 3/2) silt loam; weak, fine, granular structure; friable; many roots; slightly acid; clear, wavy boundary.

Ap2—1 to 10 inches, grayish-brown (10YR 5/2) silt loam; common medium, faint, light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/4) mottles; weak, medium, granular structure; friable; common roots; slightly acid; clear, wavy boundary.

B2g—10 to 24 inches, light-gray (10YR 7/2) light silty clay loam; common fine, faint, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; very firm; few roots; slightly acid; clear, smooth boundary.

Cg—24 to 50 inches +, dark-gray (N 4/0) light silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/8) and grayish-brown (10YR 5/2) mottles; massive; very firm; discontinuous layers and pockets of clay and silty clay throughout; 15 percent gravel; neutral.

The solum is 20 to 36 inches thick. Depth to bedrock is more than 4 feet. In unlimed areas reaction is slightly acid to neutral throughout the profile.

The Ap horizon has hue of 10YR, value of 4 to 7, and chroma of 2 or 3. In some areas the 1- or 2-inch-thick Ap1 horizon has hue of 2.5Y, value of 4 to 7, and chroma of 1 to 3. The B horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is silt loam or light silty clay loam. The profile has mottles of high and low chroma throughout.

Melvin soils are near the well drained Chagrin and Huntington soils, the moderately well drained Lindside soils, and the poorly drained and very poorly drained Dunning soils. They are not so well drained as any of those soils except Dunning soils. Their A and B horizons are finer textured than those of Chagrin soils and coarser textured than those of Dunning soils. Melvin soils have a lighter colored A horizon than Dunning and Huntington soils.

Melvin silt loam (Me).—This soil is in long, narrow areas at the base of foot slopes on some flood plains, and in places they occupy the entire flood plain along small streams. Surface runoff is generally poor, and water is ponded for long periods in some areas. Included in mapping are a few small areas of Lindside and Dunning soils and a few small areas of soils that have surface layers of sandy loam, loam, or very shaly silt loam.

If adequately drained, this soil is suited to crops commonly grown in the survey area. It is better suited to hay and pasture plants that consist of a mixture of water-tolerant grasses and legumes than to other crops. Delaying pasturing or tilling of this wet soil until it is reasonably dry and firm helps to avoid compaction and loss of tilth. Capability unit IIIw–1; woodland suitability subclass 1w.

Monongahela Series

The Monongahela series consists of deep, moderately well drained soils on stream terraces along the larger streams of the survey area. The soils formed in old acid alluvial material washed from upland soils that are underlain by sandstone, siltstone, and shale. Slopes range from 0 to 15 percent.

In a representative profile the surface layer is dark-brown silt loam about 9 inches thick. The subsoil extends to a depth of 50 inches or more. The upper 4 inches is yellowish-brown friable silt loam; the next 13 inches is yellowish-brown, firm heavy silt loam mottled with pale brown. The lower part is a very firm, brittle, fragipan. The upper 7 inches is brown light clay loam mottled with light gray and olive yellow; the next 7

inches is yellowish-brown light clay loam mottled with gray; and the lower 10 inches or more is yellowish-brown light sandy clay loam mottled with gray.

Permeability is moderately slow in the lower part of the subsoil and moderate in the upper part. Available water capacity is moderate. The seasonal high water table is at a depth of 1½ to 2½ feet. Natural fertility is low.

Monogahela soils are suited to crops commonly grown in the survey area. The fragipan in the subsoil restricts root development and movement of water through the soil, and in places the growth of deep-rooted legumes, such as alfalfa, is affected. Most areas of these soils are cleared and are used for hay or pasture. The seasonal high water table, moderately slow permeability, and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Monongahela silt loam, 0 to 3 percent slopes, in a meadow along AT&T cable trench about 675 yards south-southeast of mouth of Mill Run, 50 yards east of State Route 8, in Hampshire County:

Ap—0 to 9 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; loose; many roots; medium acid; clear, smooth boundary.

B1—9 to 13 inches, yellowish-brown (10YR 5/6) silt loam; weak, fine, subangular blocky structure; friable; common roots; 10 percent gravel; strongly acid; clear, smooth boundary.

B2t—13 to 26 inches, yellowish-brown (10YR 5/6) heavy silt loam; few, medium, faint, pale-brown (10YR 6/3) mottles at a depth of 20 inches; weak, fine and medium, subangular blocky structure; firm; common roots; few discontinuous clay films on faces of peds; 10 percent gravel; very strongly acid; gradual, wavy boundary.

Bx1—26 to 33 inches, brown (7.5YR 5/2) light clay loam; many, medium, distinct, light-gray (10YR 7/2) and olive-yellow (2.5Y 6/6) mottles; weak, very coarse, prismatic structure parting to weak, thick, platy; very firm and brittle; common discontinuous clay films on faces of peds; 5 percent gravel; very strongly acid; gradual, wavy boundary.

Bx2—33 to 40 inches, yellowish-brown (10YR 5/6) light clay loam; many, medium, faint, gray (10YR 5/1) mottles; weak, very coarse, prismatic structure parting to weak, medium, subangular blocky; very firm and brittle; common discontinuous clay films on faces of peds; many black (N 1/0) and reddish-black (10R 2/1) concretions; 10 percent gravel and cobblestones; very strongly acid; gradual, wavy boundary.

Bx3—40 to 50 inches +, yellowish-brown (10YR 5/4) light sandy clay loam; common, medium, faint, gray (10YR 5/1) mottles; weak, very coarse, prismatic structure parting to weak, coarse, subangular blocky; very firm and brittle; few discontinuous clay films on faces of peds; many black (N 1/0) and reddish-black (10R 2/1) concretions; 30 percent gravel and cobbles; very strongly acid.

The solum is 40 to 60 inches thick. Depth to the fragipan is 20 to 30 inches. Depth to bedrock is more than 4 feet. In unlimed areas the profile is strongly acid to very strongly acid throughout.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3. The B2t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8 or value of 6 and chroma of 6 to 8. Most of the Bx horizon is the same color as the B2t horizon, but in places it has hue of 7.5YR, value of 5, and chroma of 2. The Bx horizon has mottles of high and low chroma. The B2t and Bx horizons are silt loam, light silty clay loam, clay loam, and sandy clay loam.

Monongahela soils are near the well-drained Allegheny and Braddock soils, the somewhat poorly drained Tygart soils, and the poorly drained Purdy soils. None of these soils except Monongahela soils has a fragipan. Monongahela soils are not so well drained as Allegheny and Braddock soils and are less gravelly than Braddock soils. They are better drained and have a coarser textured B horizon than Tygart and Purdy soils.

Monongahela silt loam, 0 to 3 percent slopes (MhA).—This soil is on broad terraces. It has the profile described as representative of the series. Surface drainage is poor in low areas, and in places water is ponded for short periods. Included in mapping are small areas of the Allegheny and Tygart soils, a few small areas of soils that have a sandy profile, and a few areas of soils that have a clayey subsoil.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. A few formerly cropped areas have reverted to trees; Virginia pine is the common species. This soil can be cropped year after year, but the areas need the protection of a cover crop. Working the residue of a cover crop into the soil helps to improve tilth and fertility. Small, low, wet areas may need to be drained before desirable crops can be grown on this soil. Capability unit IIw–1; woodland suitability subclass 4w.

Monongahela silt loam, 3 to 8 percent slopes (MhB).—This soil is on broad terraces. It has a profile similar to the one described as representative of the series, but it is slightly more sloping and has better surface drainage. Included in mapping are a few small areas of Allegheny and Tygart soils and a few small areas of soils that have a sandy profile.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. Some formerly cropped areas have reverted to trees; Virginia pine is the common species. The hazard of erosion is moderate on unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe–13; woodland suitability subclass 4w.

Monongahela silt loam, 8 to 15 percent slopes (MhC).—This soil is mostly along breaks between less sloping terraces and areas adjoining uplands. It has a profile similar to the one described as representative of the series, but it is steeper and commonly has a thinner subsoil. Included in mapping are a few small areas of Allegheny soils, a few small areas of soils that have a shaly surface layer, and a few areas of soils that have a sandy profile.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–13; woodland suitability subclass 4w.

Monongahela silt loam, 8 to 15 percent slopes, severely eroded (MhC3).—This soil is mostly along breaks between less sloping terraces and on areas adjoining uplands. It has a profile similar to the one described as

representative of the series, but it is steeper and has a thinner subsoil. In addition, erosion has removed most of the original surface layer. Included in mapping are a few small areas of Allegheny soils, a few small areas of soils that have a shaly surface layer, and a few areas of soils that have a sandy profile.

This soil has limited suitability for crops; it is better suited to hay and pasture. A few formerly cropped areas have reverted to trees; Virginia pine is the common species. The hazard of erosion is very severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–9; woodland suitability subclass 4w.

Murrill Series

The Murrill series consists of deep, well-drained soils on foot slopes throughout the survey area. The soils formed partly in colluvial material that moved downslope from soils that are underlain by sandstone, siltstone, and shale and partly in the underlying moderately fine to fine textured residuum weathered mainly from limestone. Slopes range from 3 to 35 percent.

In a representative profile the surface layer is 2 inches of very dark gray loam over 7 inches of brown loam. The subsoil extends to a depth of 60 inches or more. The upper 4 inches is yellowish-brown, friable channery loam; the next 13 inches is strong-brown, friable channery loam; the next 17 inches is strong brown, friable channery sandy clay loam; and the lower 17 inches or more is yellowish-red, firm silty clay.

Permeability is moderate throughout. Available water capacity is moderate to high. Natural fertility is moderate to high.

The nonstony Murrill soils are suited to crops commonly grown in the survey area. Most of these areas are cleared and are used for pasture. Most areas of very stony soils are wooded. Steepness of slope is the main limitation to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Murrill very stony loam, 3 to 15 percent slopes, in a wooded area along State Route 9/10, about 3 miles south of its intersection with State Route 9, in Morgan County:

A1—0 to 2 inches, very dark gray (10YR 3/1) loam; moderate, very fine, granular structure; very friable; many roots; 10 percent coarse fragments; strongly acid; abrupt, wavy boundary.

A2—2 to 9 inches, brown (10YR 5/3) loam; weak, very fine, subangular blocky structure; very friable; common roots; 10 percent coarse fragments; very strongly acid; clear, wavy boundary.

B1—9 to 13 inches, yellowish-brown (10YR 5/4) channery loam; weak, medium, subangular blocky structure; friable; few roots; 20 percent coarse fragments; very strongly acid; clear, wavy boundary.

B21t—13 to 26 inches, strong-brown (7.5YR 5/6) channery loam; moderate, medium, subangular blocky structure; friable; few roots; few discontinuous clay films on faces of peds; 30 percent coarse fragments; very strongly acid; clear, wavy boundary.

B22t—26 to 43 inches, strong-brown (7.5YR 5/6) channery sandy clay loam; moderate, medium, subangular blocky structure; friable; few roots; common discontinuous clay films; 40 percent coarse fragments; very strongly acid; clear, wavy boundary.

IIB23t—43 to 60 inches +, yellowish-red (5YR 5/6) silty clay; moderate and strong, thick, platy structure; firm; common, continuous, very pale brown (10YR 7/3) clay films on faces of peds; very strongly acid.

Depth to bedrock is more than 6 feet. Depth to the IIB horizon ranges from 36 to 60 inches. Coarse fragments make up 10 to 40 percent of the individual layers of the A horizon and the upper part of the B horizon. In unlimed areas the profile is very strongly acid to strongly acid throughout.

The A horizon has hue of 10YR; the A1 horizon has value of 2 or 3 and chroma of 1; the A2 horizon has value of 5 or 6 and chroma of 3 to 6; and the Ap horizon has value of 3 or 4 and chroma of 2 to 4. The A horizon is channery loam or very stony loam. The upper part of the B horizon has hue of 10YR or 5YR, value of 4 to 6, and chroma of 4 or 6. It is loam, silt loam, sandy clay loam, clay loam, silty clay loam, or their channery analogs. The IIB horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is clay loam, silty clay loam, silty clay, or clay.

Murrill soils are near the well drained Murrill variant soils and the moderately well drained Clarksburg soils. The upper part of the B horizon is thicker than that of the Murrill variant soils. Murrill soils are better drained and more acid and generally are coarser textured in the A horizon and the upper part of the B horizon. They commonly are finer textured and redder in the lower part of the B horizon than Clarksburg soils. They do not have the fragipan that is characteristic of the Clarksburg soils. Murrill soils generally are coarser textured in the A horizon and in the upper part of the B horizon, and their B horizon is commonly redder and finer textured and contains fewer coarse fragments than that of the Gilpin soils.

Murrill channery loam, 3 to 8 percent slopes (MlB).—This soil is mostly on the lower part of long foot slopes and the middle part of broad benches. It has a profile similar to the one described as representative of the series, but the upper part of the subsoil is thinner, and the surface is not very stony. Included in mapping are small areas of Murrill variant soils, Opequon-Rock outcrop complex, and Berks soils. Also included are a few small areas of soils that have a surface layer of loamy sand or sand and a few areas of soils that are moderately well drained.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay and pasture in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Diversions help to intercept water received from upslope areas. Capability unit IIe–1; woodland suitability subclass 3o.

Murrill channery loam, 8 to 15 percent slopes (MlC).—This soil is mostly on the middle of long foot slopes and on the upper and lower parts of broad benches. It has a profile similar to the one described as representative of the series, but it does not have a very stony surface. Included in mapping are small areas of Murrill variant soils, Opequon-Rock outcrop complex, and Berks soils. Also included are a few small areas of soils that have a surface layer of loamy sand or sand and a few areas of soils that are moderately well drained.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–1; woodland suitability subclass 3o.

Murrill channery loam, 15 to 25 percent slopes (MlD).—This soil is mostly on the upper part of long foot slopes and benches. It has a profile similar to the one described as representative of the series, but the upper part of the subsoil is thicker, and the surface is not very stony. Included in mapping are a few small areas of Murrill variant soils, Opequon-Rock outcrop complex, and Berks soils. Also included are a few small areas of soils that have a surface layer of sand or loamy sand.

This soil has limited suitability for crops; it is better suited to hay and pasture. Many formerly cropped areas have reverted to trees; Virginia pine is the common species. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–1; woodland suitability subclass 3r.

Murrill very stony loam, 3 to 15 percent slopes (MsC).—This soil is mostly on the lower and middle parts of long foot slopes. A few areas are along drainageways and around the heads of streams. This soil has the profile described as representative of the series. Included in mapping are small areas of Murrill variant soils, Clarksburg soils, Opequon-Rock outcrop complex, and Berks soils. Also included are a few small areas of soils that have a surface layer of sand or loamy sand.

This very stony soil is not suited to crops and hay but is suited to pasture. The hazard of erosion is moderate to severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The very stony surface restricts the use of farm machinery. Capability unit VIs–1; woodland suitability subclass 3o.

Murrill very stony loam, 15 to 25 percent slopes (MsD).—This soil is mostly on the upper part of long foot slopes and on benches. It has a profile similar to the one described as representative of the series, but it is slightly steeper, and the upper part of its subsoil generally is slightly thicker. Included in mapping are small areas of Murill variant soils, Opequon-Rock outcrop complex, and Berks soils. Also included are a few small areas of soils that have a surface layer of sand or loamy sand.

This soil is not suited to crops and hay but is suited to pasture. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The very stony surface restricts the use of farm machinery. Capability unit VIs–1; woodland suitability subclass 3r.

Murrill very stony loam, 25 to 35 percent slopes (MsE).—This soil is mostly on the upper part of long foot slopes and benches adjacent to the uplands. It has a profile similar to the one described as representative of the series, but it is steeper, and the upper part of its subsoil is generally thicker. Included in mapping are small areas of Opequon-Rock outcrop complex and Berks, Dekalb, Schaffenaker, and Murrill variant soils. Also included are small areas of soils that have a surface layer of sand or loamy sand.

This soil is not suited to crops, hay, and pasture because of its very stony surface. It is better suited to trees and to wildlife habitat than to other uses. The steep slopes moderately limit the use of woodland equipment. Capability unit VIIs–1; woodland suitability subclass 3r.

Murrill Variant

The Murrill variant soils consist of deep, well-drained soils on foot slopes and benches, mostly in Hampshire County. The soils formed in moderately deep, acid colluvial material that moved downslope from soils that are underlain by sandstone, siltstone, and shale. This colluvial material is underlain by moderately fine textured to fine textured material weathered mainly from limestone. Slopes range from 3 to 25 percent.

In a representative profile, the surface layer is 7 inches of dark-brown channery loam over 6 inches of yellowish-brown channery loam. The subsoil is about 38 inches thick. The upper 10 inches is strong-brown, friable heavy silt loam, and the lower 28 inches is yellowish-red, firm silty clay. The substratum extends to a depth of 60 inches or more. It is yellowish-red shaly silty clay loam.

Permeability is moderate throughout. Available water capacity is moderate to high. Natural fertility is high.

The Murrill variant soils are suited to crops commonly grown in the survey area. Most areas of gently sloping and strongly sloping soils are cleared and are used mainly for pasture. Most areas of moderately steep soils are wooded. The moderate shrink-swell potential of the subsoil and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Murrill channery loam, clayey subsoil variant, 3 to 8 percent slopes, in an abandoned garden, about ¾ mile south of Slate Lick Knob fire tower, 300 yards southeast of the Mineral County line on ridge:

Ap—0 to 7 inches, dark-brown (10YR 4/3) channery loam; moderate, fine, granular structure; very friable; many roots; 20 percent coarse fragments; strongly acid, abrupt, smooth boundary.

A2—7 to 13 inches, yellowish-brown (10YR 5/4) channery loam; weak, thick, platy structure; friable; common roots; 25 percent coarse fragments; strongly acid; clear, smooth boundary.

B21t—13 to 23 inches, strong-brown (7.5YR 5/6) heavy silt loam; weak and moderate, medium and coarse, subangular blocky structure; friable; common roots; few discontinuous clay films on faces of

peds; 10 percent coarse fragments; strongly acid; clear, smooth boundary.

IIB22t—23 to 29 inches, yellow-red (5YR 5/8) silty clay; moderate, fine and medium, subangular blocky structure; firm; common roots; few, discontinuous, pink (5YR 7/3) clay films on faces of peds; 5 percent coarse fragments; strongly acid; clear, smooth boundary.

IIB23t—29 to 37 inches, yellowish-red (5YR 5/8) silty clay; moderate and strong, fine and medium, subangular blocky structure; firm; few roots; common, continuous, pinkish-gray (5YR 7/2) clay films on faces of peds; few coarse fragments; strongly acid; clear, wavy boundary.

IIB3t—37 to 51 inches, yellowish-red (5YR 5/8) silty clay; weak, medium, platy structure; firm; common, discontinuous, pinkish-gray (5YR 7/2) clay films on faces of peds; few coarse fragments; strongly acid; clear, wavy boundary.

IIC—51 to 60 inches +, yellowish-red (5YR 5/8) and red (2.5YR 4/6) inside of peds, pinkish-gray (5YR 7/2) outside of peds, shaly silty clay loam; few thin layers of light-gray (10YR 7/1) silt; massive; firm; 30 percent coarse fragments; strongly acid.

Depth to bedrock is greater than 5 feet. Depth to the IIB horizon ranges from 20 to 36 inches. Coarse fragments make up 10 to 30 percent of the A horizon and the upper part of the B horizon and 0 to 15 percent of the IIB horizon.

The A horizon has hue of 10YR; the A1 horizon has value of 2 or 3 and chroma of 1; and the A2 horizon has value of 5 or 6 and chroma of 3 to 6. The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. The B21t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 or 6. It is loam, silty clay loam, clay loam, silt loam, or sandy clay loam. The IIB horizon has hue of 10YR to 2.5YR, value of 5, and chroma of 6 or 8 or hue of 2.5YR, value of 4, and chroma of 6 or 8. It is clay loam, silty clay, or clay.

Murrill variant soils are near the well drained Murrill soils and the moderately well drained Clarksburg soils. The upper part of the B horizon of the Murrill variant soils is thinner than that of Murrill soils. Murrill variant soils are better drained and more acid than Clarksburg soils, and their A horizon and the upper part of their B horizon are coarser textured. The lower part of their B horizon is commonly redder and finer textured than that of Clarksburg soils. Also they do not have the fragipan that is characteristic of those soils. Murrill variant soils generally are coarser textured in the A horizon and in the upper part of the B horizon than Gilpin soils, and they are commonly redder and finer textured in the lower part of the B horizon, which contains fewer coarse fragments than that of those soils.

Murrill channery loam, clayey subsoil variant, 3 to 8 percent slopes (MvB).—This soil is on side slopes, benches, and broad ridgetops. It has the profile described as representative of the series. Included in mapping are a few small areas of Murrill soils, Opequon-Rock outcrop complex, and Berks soils; a few small areas of soils that have a surface layer of fine sandy loam or loamy fine sand; and a few small areas of soils that are very stony.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe–1; woodland suitability subclass 3o.

Murrill channery loam, clayey subsoil variant, 8 to 15 percent slopes (MvC).—This soil is mostly on the rounded tops of hills and ridges and on the upper part of benches. It has a profile similar to the one described as representative of the series, but it is more sloping, and the upper part of its subsoil is slightly thicker. Included in mapping are a few small areas of Murrill soils, Opequon-Rock outcrop complex, and Berks soils; a few small areas of soils that have a surface layer of fine sandy loam or loamy fine sand; and a few areas that are very stony.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–1; woodland suitability subclass 3o.

Murrill channery loam, clayey subsoil variant, 15 to 25 percent slopes (MvD).—This soil is on the sides of hills and mountains and on narrow benches. It has a profile similar to the one described as representative of the series, but it is steeper, and the upper part of its subsoil is generally slightly thicker. Included in mapping are a few small areas of Murrill soils, Opequon-Rock outcrop complex, and Berks soils and a few small areas of soils that have a surface layer of fine sandy loam and loamy fine sand.

This soil has limited suitability for crops; it is better suited to hay and pasture. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–1; woodland suitability subclass 3r.

Opequon Series

The Opequon series consists of shallow, well-drained soils on uplands in widely scattered areas, mostly in Hampshire and Mineral Counties. The soils formed in limy material weathered from relatively pure limestone. Slopes range from 8 to 65 percent.

In a representative profile the surface layer is brown silty clay loam about 6 inches thick. The yellowish-red, firm subsoil is about 10 inches thick. The upper 5 inches is silty clay, and the lower 5 inches is clay. Limestone bedrock is at a depth of 16 inches.

Permeability is moderately slow in the subsoil. Available water capacity is low to very low. Natural fertility is high.

The strongly sloping and moderately steep Opequon soils are suited to pasture. Cleared areas of those soils are mostly in pasture. Most areas of steep and very steep soils are wooded. Limited depth to bedrock, moderately slow permeability, moderate to high shrink-swell potential, rockiness, and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Opequon silty clay loam, in

an area of Opequon-Rock outcrop complex, 25 to 65 percent slopes, in an old meadow on Mill Creek Mountain along the AT&T cable trench, about 675 yards west of South Branch River and about 600 yards north of the junction of State Routes 220/11 and 220/14, in Hampshire County:

Ap—0 to 6 inches, brown (7.5YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; friable; many roots; about 10 percent coarse fragments; neutral; clear, smooth boundary.

B21t—6 to 11 inches, yellowish-red (5YR 4/6) silty clay; moderate, fine and medium, subangular blocky structure; firm; sticky and plastic; common roots; few discontinuous clay films on faces of peds; slightly acid; clear, smooth boundary.

B22t—11 to 16 inches, yellowish-red (5YR 4/6) clay; strong, fine and medium, subangular blocky structure; firm; common continuous clay films on faces of peds; 15 percent coarse fragments; neutral; abrupt, irregular boundary.

B—16 inches, pinkish-gray (5YR 7/2) "rind," ¼ inch thick, on outside of gray (N 6/0), tilted limestone bedrock.

The solum is 12 to 20 inches thick. Depth to bedrock is 12 to 20 inches. Coarse fragments are 0 to 35 percent of the B horizon. In unlimed areas the profile is medium acid to neutral throughout.

The Ap horizon has hue of 10YR to 5YR, value of 3 or 4, and chroma of 4 or 6. The Ap horizon has very rocky phases of silty clay loam or silty clay. The B horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8 and includes hue of 7.5YR, value of 5, and chroma of 6 or 8. It is silty clay, heavy silty clay loam, and clay.

Opequon soils are near the well-drained Edom, Edom variant, Elliber, and Schaffenaker soils. They are more shallow than any of those soils. They are less acid, redder, and finer textured throughout than Elliber and Schaffenaker soils. Also, Opequon soils have fewer coarse fragments throughout the profile than Elliber soils.

Opequon-Rock outcrop complex, 8 to 25 percent slopes (OpD).—This complex is about 75 percent Opequon silty clay loam, about 15 percent Rock outcrop, and about 10 percent less extensive soils. The Opequon part of this complex has a profile similar to the one described as representative of the Opequon series, but it is slightly deeper. The Rock outcrop is of limestone, and limestone fragments are common on the surface. Included in mapping are a few small areas of soils that are deeper than these soils, a few areas of soils that are less sloping, and a few nonrocky areas.

This complex is not suited to crops and hay; it is suited to pasture. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. The very rocky surface restricts the use of farm machinery. Capability unit VIs–1; woodland suitability subclass 3x.

Opequon-Rock outcrop complex, 8 to 25 percent slopes, severely eroded (OpD3).—This complex is about 70 percent Opequon silty clay loam, about 20 percent Rock outcrop, and 10 percent less extensive soils. The Opequon soil has a profile similar to the one described as representative of the series, but it is less sloping, erosion has removed most of the original surface layer, and the subsoil is exposed in places. The Rock outcrop is limestone, and limestone fragments are common on the surface. Included in mapping are a few small areas of soils that are deeper than these soils and a few areas of soils that are less sloping.

This complex has limited suitability for pasture; it is better suited to trees and to wildlife habitat. Rockiness and slope moderately limit the use of woodland equipment. Capability unit VIIs–1; woodland suitability subclass 3x.

Opequon-Rock outcrop complex, 25 to 65 percent slopes (OpF).—This complex is about 70 percent Opequon silty clay loam, about 20 percent Rock outcrop, and 10 percent less extensive soils. The Opequon soil has the profile described as representative of the Opequon series. The Rock outcrop is limestone, and limestone fragments are common on the surface. Included in mapping are a few small areas of soils that are deeper than this soil and a few areas of soils that are severely eroded.

This complex is not suited to crops, hay, and pasture because of the very rocky surface and steep and very steep slopes. It is better suited to trees and to wildlife habitat than to other uses. The steep and very steep slopes severely limit the use of woodland equipment. Capability unit VIIs–1; woodland suitability subclass—north aspect 3x, south aspect 4x.

Philo Series

The Philo series consists of deep, moderately well drained soils on flood plains in areas scattered throughout the survey area. The soils formed in acid alluvial material washed from soils that are underlain by sandstone, siltstone, and shale. They are subject to flooding. Slopes range from 0 to 3 percent.

In a representative profile the surface layer is brown silt loam about 7 inches thick. The yellowish-brown subsoil is about 19 inches thick. The upper 7 inches is friable silt loam, and the lower 12 inches is firm silt loam mottled with light brownish gray and brown. The substratum extends to a depth of 60 inches or more. The upper 12 inches is yellowish-brown silt loam mottled with light brownish gray and brown, and the lower 22 inches or more is gray, light yellowish-brown, and yellowish-red stratified sandy loam and light clay loam.

Permeability is moderate to moderately slow in the subsoil. Available water capacity is high. The seasonal high water table is at a depth of 1½ to 2 feet. Natural fertility is moderate.

Philo soils are suited to crops commonly grown in the survey area. Most areas are cleared and are used mainly for crops and hay. However, deep-rooted legumes, such as alfalfa, do not grow well on these moderately wet soils. The hazard of flooding and seasonal high water table are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Philo silt loam, in a meadow along the north bank of Mill Creek, 200 yards northeast of the intersection of U.S. Highway 50 and State Route 28, in Hampshire County:

Ap—0 to 7 inches. brown (10YR 4/3) silt loam; weak, fine, subangular blocky structure; friable; many roots; neutral; clear, smooth boundary.

B1—7 to 14 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine and medium, subangular blocky structure; friable; many roots; medium acid; clear, smooth boundary.

B2—14 to 26 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, distinct, light brownish-gray (10YR 6/2) and brown (7.5YR 5/4) mottles; weak, medium, subangular blocky structure; firm; common roots; medium acid; clear, wavy boundary.

C1—26 to 38 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, distinct, light brownish-gray (10YR 6/2) and brown (7.5YR 5/4) mottles; massive; firm; few roots; medium acid; clear, smooth boundary.

C2g—38 to 60 inches +, gray (10YR 5/1), light yellowish-brown (10YR 6/4), and yellowish-red (5YR 4/6) stratified sandy loam, silt loam, and light clay loam; massive; firm; strongly acid.

The solum is 20 to 40 inches thick. Stratified material is at a depth of 34 inches in some places. Depth to bedrock is more than 3½ feet. In unlimed areas the profile is strongly acid to medium acid throughout.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam, fine sandy loam, and gravelly loam. The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is silt loam, fine sandy loam, or their gravelly analogs. The lower part of the B horizon and the C horizon have mottles of high and low chroma.

Philo soils are near the well-drained Pope soils and the poorly drained Atkins soils. They are not so well drained as Pope soils and are better drained than Atkins soils. Philo soils have a coarser textured B horizon than Atkins soils.

Philo fine sandy loam (Pf).—This nearly level soil is generally in long, narrow areas on wide flood plains, but in places it occupies the entire flood plain along small streams. It has a profile similar to the one described as representative of the series, but it has a slightly coarser textured profile. Included in mapping are a few small areas of Atkins and Pope soils and, along the Cacapon and North Rivers, a few small areas of soils that have a redder profile.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. It needs slightly more intensive management than the soil described as representative of the series. In places small wet areas need to be drained before desirable crops can be grown. This soil can be cropped year after year, but the areas need the protection of a cover crop. Working the residue of cover crop into the soil helps to improve tilth and fertility. Crops are likely to be damaged occasionally by flooding. Capability unit IIw–7; woodland suitability subclass 1w.

Philo gravelly loam (Pg).—This soil is usually on alluvial fans and along small, swift streams. It has a profile similar to the one described as representative of the series, but it has a gravelly profile. Included in mapping are a few small areas of Atkins and Pope soils and a few small areas of Fluvaquents along small drainageways.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. It needs slightly more intensive management than the soil described as representative of the series. It can be cropped every year, but the areas need the protection of a cover crop. Working residue of a cover crop into the soil helps to improve tilth and fertility. In places crops are damaged occasionally by flooding. Capability unit IIw–7; woodland suitability subclass 1w.

Philo silt loam (Ph).—This soil is generally in long, narrow areas on wide flood plains, but in places it occupies the entire flood plain along small streams. It has the profile described as representative of the series. Included in mapping are a few small areas of Atkins, Pope, and Tygart soils.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. In places, however, small wet areas need to be drained before desirable crops can be grown. The soil can be cropped year after year, but the areas need the protection of a cover crop. Working the residue of a cover crop into the soil helps to improve tilth and fertility. In places crops are damaged occasionally by flooding. Capability unit IIw–7; woodland suitability subclass 1w.

Pope Series

The Pope series consists of deep, well-drained soils on flood plains in areas scattered throughout the survey area. The soils formed in acid alluvial material washed from soils that are underlain by sandstone, siltstone, and shale. Pope soils are subject to flooding. Slopes range from 0 to 3 percent.

In a representative profile the surface layer is 4 inches of dark-brown fine sandy loam over 7 inches of brown fine sandy loam. The subsoil is dark yellowish-brown, friable fine sandy loam about 31 inches thick. The substratum extends to a depth of 60 inches or more. It is dark yellowish-brown and yellowish-brown stratified loamy sand and sandy loam.

Permeability is moderate to moderately rapid. Available water capacity is moderate to high. Natural fertility is moderate.

Pope soils are suited to crops commonly grown in the survey area. Most areas are cleared and are used mainly for crops and hay. The hazard of flooding is the main limitation to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Pope fine sandy loam, in woodland along Cacapon River, 50 feet east of State Route 14 and about 1.2 miles south-southeast of the mouth of Dillons Run, in Hampshire County:

A1—0 to 4 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; loose; many roots; strongly acid; clear, smooth boundary.

A2—4 to 11 inches, brown (10YR 4/3) fine sandy loam; weak, fine and medium, granular structure; loose; many roots; strongly acid; clear, smooth boundary.

B—11 to 42 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, coarse, subangular blocky structure; friable; few roots; strongly acid; gradual, wavy boundary.

C—42 to 60 inches +, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/8) stratified loamy sand and sandy loam; single grained; very friable; strongly acid.

The solum is 34 to 46 inches thick. Depth to bedrock is more than 3½ feet. Coarse fragments make up 0 to 30 percent of the A and B horizons and as much as 40 percent of the C horizon. In unlimed areas the profile is very strongly acid to strongly acid throughout.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. The A2 horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is fine sandy loam, silt loam, and gravelly sandy loam. The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is fine sandy loam, loam, silt loam, or their gravelly analogs.

Pope soils are near the moderately well drained Philo soils and the poorly drained Atkins soils. They are better

drained than Philo and Atkins soils and have a coarser textured B horizon than Atkins soils.

Pope fine sandy loam (Pm).—This soil is mainly in long, narrow areas adjoining streams. It has the profile described as representative of the series. Included in mapping are a few small areas of Philo soils. Also included along the Cacapon and North Rivers are a few small areas of soils that have a redder profile, a few areas of soils that are more sloping than this soil, and a few areas of soils that have a shaly or very shaly surface layer.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. It can be cropped year after year, but the areas need the protection of a cover crop. Working residue of a cover crop into the soil helps to improve tilth and fertility. In places crops are damaged occasionally by flooding. Capability unit IIw–6; woodland suitability subclass 2o.

Pope silt loam (Po).—This soil is mainly on wide flood plains in areas between the wetter soils near foot slopes and sandier soils adjoining the streams. Along some streams this soil occupies the entire flood plain. It has a profile similar to the one described as representative of the series, but it has a finer textured surface layer. Included in mapping are a few small areas of Philo soils, a few small areas of soils that are more sloping than this soil, and a few areas of soils that have a shaly or very shaly surface layer.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. It can be cropped year after year, but the areas need the protection of a cover crop. Working residue of a cover crop into the soil helps to improve tilth and fertility. In places crops are damaged occasionally by flooding. Capability unit IIw–6; woodland suitability subclass 2o.

Pope gravelly sandy loam (Ps).—This soil is in small, irregularly shaped areas along larger streams, in delta-shaped areas at the mouths of small streams, and on long, narrow flood plains along smaller, swifter streams. It has a profile similar to the one described as representative of the series, but it has a more gravelly profile. Included in mapping are a few small areas of Philo soils, a few small areas of soils that have a shaly profile, a few areas of soils that are more sloping than this soil, and a few areas of soils that have a more gravelly profile.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. It is gravelly and needs intensive management to improve available water capacity. It can be cropped year after year, but the areas need the protection of a cover crop. Working the residue of a cover crop into the soil helps to improve tilth and fertility. Crops are subject to damage occasionally by flooding. Capability unit IIw–6; woodland suitability subclass 2o.

Purdy Series

The Purdy series consists of deep, poorly drained and very poorly drained soils on terraces in scattered areas, mostly in Hampshire and Mineral Counties. The soils formed in acid alluvial material deposited by slackwater and washed from soils that are underlain by sandstone, siltstone, and shale. Purdy soils are subject to ponding. Slopes range from 0 to 3 percent.

In a representative profile the surface layer is mottled dark grayish-brown and brownish-yellow silty clay loam about 7 inches thick. The subsoil is about 28 inches thick. The upper 13 inches is dark-gray, very firm silty clay mottled with light yellowish brown and yellowish brown. The lower 15 inches is gray, very firm clay mottled with dark gray, light yellowish brown, and yellowish brown. The substratum extends to a depth of 50 inches or more. It is dark-gray, gray, and pale-brown stratified silty clay loam, clay loam, and clay.

Permeability is slow in the subsoil. Available water capacity is high. A seasonal high water table is at or near the surface. Natural fertility is low.

Drainage is needed before desirable crops can be grown on Purdy soils. If drained, the soils have limited suitability for crops; they are better suited to hay and pasture plants that tolerate some wetness than to other uses. Most areas are cleared and are used mainly for pasture and hay. A seasonal high water table, moderate shrink-swell potential, and slow permeability are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Purdy silty clay loam, in a meadow 1,100 yards north-northeast of the Chessie System railroad, and U.S. Highway 50 intersection at Vanderlip, 320 yards west of South Branch River, Hampshire County:

Ap—0 to 7 inches, mottled, dark grayish-brown (10YR 4/2) and brownish-yellow (10YR 6/6) silty clay loam; strong, fine and medium, subangular blocky structure; firm and nonsticky; many roots; olive-brown (2.5Y 4/4) coatings inside of root channels; strongly acid; clear, smooth boundary.

B1tg—7 to 20 inches, dark-gray (10YR 4/1) silty clay; many, medium, faint, light yellowish-brown (10YR 6/4) and yellowish-brown (10YR 5/8) mottles; weak, coarse, subangular blocky structure; very firm, slightly sticky, and slightly plastic; few roots; thin discontinuous clay films on faces of peds; strongly acid; clear, smooth boundary.

B2tg—20 to 35 inches, gray (10YR 5/1) clay; many, medium, faint, dark-gray (10YR 4/1), light yellowish-brown (10YR 6/4), and yellowish-brown (10YR 5/8) mottles; weak, medium and coarse, angular blocky structure; very firm; slightly sticky and slightly plastic; common continuous clay films on faces of peds; strongly acid; clear, wavy boundary.

Cg—35 to 50 inches +, dark-gray (10YR 4/1), gray (10YR 6/1), and pale-brown (10YR 6/3) stratified silty clay loam, clay loam, and clay; firm; massive; 30 percent gravel; very strongly acid.

The solum is 30 to 42 inches thick. Depth to bedrock is more than 4 feet. In unlimed areas the profile is strongly acid or very strongly acid throughout.

The Ap horizon has hue of 10YR, 2.5Y, or 5Y, value of 4, and chroma of 1 or 2. The B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2 or hue of N, value of 4 or 5, and chroma of 0. It is clay, silty clay, or silty clay loam. The profile has mottles of high and low chroma throughout.

Purdy soils are near the moderately well drained Monongahela soils and the somewhat poorly drained Tygart soils. They are not so well drained as any of those soils. Purdy soils have a finer textured B horizon than Monongahela soils and do not have the fragipan that is characteristic of those soils.

Purdy silty clay loam (Pu).—This soil is mainly in round, oval, or elongated areas in depressions and in nearly level areas above the flood plain. Surface drainage is generally poor, and in places water ponds for moderately long periods. Included in mapping are a few small areas of Tygart soils, a few small areas of soils that have a silt loam or shaly surface layer, and a few areas of soils that have a darker surface layer than this Purdy soil.

If adequately drained, this soil has limited suitability for crops. It is better suited to hay and pasture plants that consist of a mixture of water-tolerant grasses and legumes than to other crops. It is difficult to drain because of its fine-textured, slowly permeable subsoil. Delaying pasturing or tilling this wet soil until it is reasonably dry helps to avoid compaction and loss of tilth. Capability unit IVw–1; woodland suitability subclass 1w.

Ramsey Series

The Ramsey series consists of shallow, excessively drained soils on uplands, mostly in mountainous areas of Hampshire and Mineral Counties. The soils formed in acid material weathered from sandstone. Slopes range from 8 to 65 percent.

In a representative profile the surface layer is 2 inches of dark-brown sandy loam over 6 inches of brown sandy loam. The subsoil is yellowish-brown, friable channery sandy loam about 6 inches thick. The substratum extends to a depth of 17 inches. It is yellowish-brown channery sandy loam underlain by sandstone bedrock.

Permeability is rapid throughout. Available water capacity is very low. Natural fertility is very low.

These extremely stony soils are better suited to trees than to other purposes. Most areas are wooded. Limited depth to bedrock, an extremely stony surface, and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Ramsey-Dekalb extremely stony sandy loams, 8 to 25 percent slopes, in a woodland on Nathaniel Mountain, 200 feet south of clearing No. 5, 50 feet west of road to fire tower, in Hampshire County:

O2—1 inch to 0, decomposed leaves.
A1—0 to 2 inches, dark-brown (10YR 3/3) sandy loam; weak, fine, granular structure; loose; 10 to 15 percent coarse fragments; common roots; very strongly acid; clear, smooth boundary.
A2—2 to 8 inches, brown (10YR 4/3) sandy loam; single grained; loose; 10 to 15 percent coarse fragments; common roots; very strongly acid; clear, smooth boundary.
B—8 to 14 inches, yellowish-brown (10YR 5/6) channery sandy loam; weak, coarse, subangular blocky structure; friable; 30 percent coarse fragments; few roots; very strongly acid; clear, wavy boundary.
C—14 to 17 inches, yellowish-brown (10YR 5/6) channery sandy loam; massive; friable; 30 percent coarse fragments; very strongly acid; abrupt, wavy boundary.
R—17 inches, sandstone bedrock.

Depth to bedrock is 10 to 20 inches. Coarse fragments are throughout the profile and make up 10 to 35 percent of the mass. In unlimed areas the profile is strongly acid to very strongly acid throughout.

The A horizon has hue of 10YR; the A1 horizon has value of 3 or 4 and chroma of 2 or 3; and the A2 horizon has value of 4 or 5 and chroma of 3. The B horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 or 6. It is loam, sandy loam, or their channery analogs.

Ramsey soils are near the well-drained Dekalb and Schaffenaker soils. They are shallower than any of those soils. They have fewer coarse fragments in the profile than Dekalb soils.

Ramsey-Dekalb extremely stony sandy loams, 8 to 25 percent slopes (RdD).—These soils are mostly on ridgetops. About 50 percent of this mapping unit is Ramsey extremely stony sandy loam, about 40 percent is Dekalb extremely stony sandy loam, and about 10 percent is less extensive soils. The Ramsey part has the profile described as representative of the Ramsey series. The Dekalb part has a profile similar to the one described as representative of the Dekalb series, but its surface is stonier. Included in mapping are a few small areas of soils that have a profile of loamy sand and a few areas of Typic Dystrochrepts, stony.

These soils are unsuited to cultivated crops, hay, and pasture because of the extremely stony surface. They are better suited to trees and to wildlife habitat than to other purposes. The extremely stony surface and steepness of slopes moderately limit the use of woodland equipment. Capability unit VIIs–4; woodland suitability subclass 6x.

Ramsey-Dekalb extremely stony sandy loams, 25 to 65 percent slopes (RdF).—These soils are on narrow ridges, knobs, and mountain slopes. About 50 percent of this mapping unit is Ramsey extremely stony sandy loam, about 40 percent is Dekalb extremely stony sandy loam, and about 10 percent is less extensive soils. The Ramsey part has a profile similar to the one described as representative of the Ramsey series, but it is steeper and slightly shallower. The Dekalb part has a profile similar to the one described as representative of the Dekalb series, but it is steeper and slightly shallower, and its surface is stonier. Included in mapping are a few small areas of Lehew and Dekalb very stony soils, a few small areas of soils that have a profile of loamy sand, and a few areas of Typic Dystrochrepts, stony.

These soils are not suited to crops, hay, and pasture, because of the extremely stony surface and steep and very steep slopes. They are better suited to trees and to wildlife habitat than to other uses. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIs–4; woodland suitability subclass—north aspect 5x, south aspect 6x.

Rubble Land

Rubble land (Rn) consists of areas covered with stones and boulders (fig. 5). These areas include adjacent vertical sandstone cliffs. In some areas sandstone bedrock is parallel to the land surface, and there is no soil cover. Rubble land is in the steeper mountainous areas of the survey area.

Areas of this land type lack vegetation and are not suited to plant growth, except possibly in an occasional crack in the bedrock. This land type is better suited to

use as scenic sites. Capability unit VIIIs–1; not placed in a woodland suitability subclass.

Rushtown Series

The Rushtown series consists of deep, excessively drained soils that occur mostly along Pattersons Creek, but small tracts are in other parts of the survey area. The soils formed in acid colluvial-alluvial material that moved downslope from soils that are underlain by shale, siltstone, and sandstone. The material from which these soils formed is deep, small, thin shale particles. Slopes range from 8 to 65 percent.

In a representative profile the surface layer is 1 inch of very dark grayish-brown shaly silt loam over 4 inches of dark yellowish-brown shaly silt loam. The subsoil is yellowish-brown, friable shaly silt loam about 16 inches thick. The substratum extends to a depth of 60 inches or more. It is yellowish-brown very shaly silt loam.

Permeability is rapid throughout. Available water capacity is low to very low. Natural fertility is very low.

The strongly sloping and moderately steep soils are suited to pasture, and the very steep soils are suited to trees. Rushtown soils are droughty, and special management is needed to limit soil and water losses and to maintain fertility and good tilth. Most areas are wooded. Steepness of slope is the main limitation to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Rushtown shaly silt loam, 8 to 25 percent slopes, in a wooded area 2 miles north of State Route 9 on Cherry Run Road at Snyder Evangelical United Brethren Church in Morgan County:

O1–O2—1 inch to 0, loose hardwood leaves cover 1/2 inch of dark, partly decomposed leaf litter.

A1—0 to 1 inch, very dark grayish-brown (10YR 3/2) shaly silt loam; weak, very fine, granular structure; loose; 20 percent fine fragments of shale; medium acid; clear wavy boundary.

A2—1 to 5 inches, dark yellowish-brown (10YR 3/4) shaly silt loam; moderate, fine, granular structure; very friable; about 30 percent fine fragments of shale; many fine roots; strongly acid; clear, wavy boundary.

B—5 to 21 inches, yellowish-brown (10YR 5/4) shaly silt loam; very weak, coarse, subangular blocky struc-

Figure 5.—Steep, barren area of Rubble land on side slopes and Schaffenaker very stony loamy sand, 3 to 15 percent slopes, on ridgetops.

ture; friable; about 40 percent small fragments of shale; silt films on fragments of shale; few fine roots; strongly acid; gradual, wavy boundary.

C—21 to 60 inches, yellowish-brown (10YR 5/4) very shaly silt loam; about 75 percent fragments of shale; single grained; very friable to noncoherent; a few roots; strongly acid.

The solum is 20 to 40 inches thick. Depth to bedrock ranges from 5 to more than 30 feet. Coarse fragments of shale about 1/2 inch across make up 20 to 30 percent of the A horizon, 30 to 60 percent of the B horizon, and 60 to 90 percent of the C horizon. Silt loam bridges between the coarse fragments give a brittle character to some layers. The C horizon has voids between fragments of shale. In unlimed areas the profile is strongly acid to very strongly acid in the B and C horizons.

The A horizon has hue of 10YR; the A1 horizon has value of 2 or 3 and chroma of 2 to 4; the A2 horizon has value and chroma of 3 or 4; and the Ap horizon has value of 4 or 5 and chroma of 2 or 3. The B and C horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. The B horizon is shaly silt loam or very shaly silt loam. The C horizon is very shaly silt loam or extremely shaly silt loam.

Rushtown soils are near Berks, Weikert, and Ernest soils. They are deeper than Berks and Weikert soils. Rushtown soils have more coarse fragments throughout than Ernest soils, and they are better drained. In addition, they lack a fragipan, which is characteristic of Ernest soils.

Rushtown shaly silt loam, 8 to 25 percent slopes (RuD).—This soil is mostly on the lower part of slopes. It has the profile described as representative of the series. Included in mapping are a few small areas of Ernest soils, a few small areas of soils in which reaction in the C horizon is neutral, a few areas of less sloping soils, a few areas of soils that have a shaly loam surface layer, and a few areas of soils that have fewer coarse fragments in their C horizon than this Rushtown soil.

This soil is not suited to crops; it is suited to pasture. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIe–31; woodland suitability subclass 4f.

Rushtown shaly silt loam, 35 to 65 percent slopes (RuF).—This soil is mostly on the upper part of slopes and north slopes of shale uplands. It has a profile similar to the one described as representative of the series, but it is steeper. Included in mapping are a few small areas of soils in which reaction in the C horizon is neutral, a few areas of soils that have a shaly loam surface layer, a few areas of less sloping soils, and a few areas of soils that have fewer coarse fragments in the C horizon than this Rushtown soil.

This soil has limited suitability for pasture because of the very steep slopes and severe hazard of erosion in unprotected areas. It is better suited to trees and to wildlife habitat than to other uses. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIe–3; woodland suitability subclass 4f.

Schaffenaker Series

The Schaffenaker series consists of moderately deep, well-drained soils on uplands, mostly in the eastern part of Hampshire County and the central part of Morgan County. The soils formed in acid material weathered from coarse-grained sandstone. Slopes range from 3 to 65 percent.

In a representative profile the surface layer is 2 inches of black loamy sand over 3 inches of brown loamy sand. The subsoil is yellowish-brown, loose and very friable loamy sand about 18 inches thick. The substratum extends to a depth of 38 inches. It is yellowish-brown loamy sand underlain by sandstone bedrock.

Permeability is very rapid throughout. Available water capacity is very low. Natural fertility is very low.

These droughty, very stony soils are better suited to trees than to other purposes. Most areas are wooded. Limited depth to bedrock and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Schaffenaker very stony loamy sand, 3 to 15 percent slopes, in wooded area 4½ miles on State Route 50/25 (Dillons Run Road), south of U.S. Highway 50, on the eastern ridge of Schaffenaker Mountain, in Hampshire County:

O1—2 inches to 0, loose leaf litter, mainly oak and Virginia pine.

A1—0 to 2 inches, black (10YR 2/1) loamy sand, 30 percent white (10YR 8/1) uncoated grains of sand; weak, fine, granular structure; very friable; many roots; very strongly acid; abrupt, smooth boundary.

A2—2 to 5 inches, brown (10YR 5/3) loamy sand; single grained; loose; many roots; very strongly acid; clear, smooth boundary.

B1—5 to 12 inches, yellowish-brown (10YR 5/6) loamy sand; weak, fine, granular structure; loose; few roots; 10 percent weak, coarse aggregates 1/2 inch to 2 inches in diameter; strongly acid; gradual, wavy boundary.

B2—12 to 23 inches, yellowish-brown (10YR 5/6) loamy sand; weak, fine, granular structure; very friable; few roots; 20 percent very weak, coarse aggregates; strongly acid; gradual, wavy boundary.

C—23 to 38 inches, yellowish-brown (10YR 5/8) loamy sand; single grained; loose; strongly acid; abrupt, wavy boundary.

R—38 inches, coarse-grained, weakly cemented, gray Oriskany sandstone.

Depth of bedrock is 20 to 40 inches. Coarse fragments make up 0 to 30 percent of the A and B horizons and as much as 50 percent of the C horizon. Thin lamellalike bands 3 or 4 feet long, which do not have a significant clay content, are in some profiles. In unlimed areas the profile is extremely acid to strongly acid throughout.

The A horizon has hue of 10YR; the A1 horizon has value of 2 to 4 and chroma of 1 or 2; and the A2 horizon has value of 4 to 6 and chroma of 3 or 4. The B horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is sand or loamy sand. The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8.

Schaffenaker soils are near the somewhat excessively drained Ramsey soils and the well-drained Dekalb and Opequon soils. They are deeper than Ramsey soils, have fewer coarse fragments in the profile than Dekalb soils, and are deeper and coarser, less red, and more acid throughout than Opequon soils.

Schaffenaker very stony loamy sand, 3 to 15 percent slopes (ShC).—This soil is on broad ridgetops and benches. It has the profile described as representative of the series. Large boulders 10 to 20 feet across are common in some areas. Included in mapping are a few

small areas of Dekalb soils, a few small areas of soils in which reaction in the B and C horizons is slightly acid to neutral, a few areas that are nonstony, and a few areas of well drained and moderately well drained sands and loamy sands on foot slopes.

This soil is not suited to crops, hay, and pasture, because it is droughty and has a very stony surface. It is better suited to trees and to wildlife habitat than to other uses. Capability unit VIIs–2; woodland suitability subclass 4s.

Schaffenaker very stony loamy sand, 15 to 35 percent slopes (ShE).—This soil is on rounded hills and ridges and narrow benches. It has a profile similar to the one described as representative of the series, but it is steeper and shallower and has more rock outcrops. Included in mapping are a few small areas of Dekalb soils, a few small areas of soils in which reaction in the B and C horizons is slightly acid to neutral, and a few areas that are nonstony.

This soil is not suited to crops or to hay and pasture, because it is droughty and has a very stony surface. It is better suited to trees and to wildlife habitat than to other uses. Steepness of slope moderately limits the use of woodland equipment. Capability unit VIIs–2; woodland suitability subclass—north aspect 4s, south aspect 5s.

Schaffenaker very stony loamy sand, 35 to 65 percent slopes (ShF).—This soil is on the sides of mountains and hills. It has a profile similar to the one described as representative of the series, but it is steeper, is shallower, and has more rock outcrops. Included in mapping are a few small areas of Dekalb soils and a few small areas of soils in which reaction in the B and C horizons is slightly acid to neutral.

This soil is not suited to crops, hay, and pasture, because it is droughty, very steep, and has a very stony surface. It is better suited to trees and to wildlife habitat. The very steep slopes severely limit the use of woodland equipment. Capability unit VIIs–2; woodland suitability subclass—north aspect 4s, south aspect 5s.

Strip Mine

Strip mine (SM) consists of level and unlevel areas of spoil remaining from surface mining. Areas of Strip mine are mostly on the Allegheny Plateau in the western part of Mineral County. The spoil is a mixture of soil, rock, and coal fragments. Slopes range from 0 to 65 percent. The amount of coarse material on the surface and in the spoil varies from place to place. Acidity is also variable. The weight of the spoil material creates a hazard of slippage onto soils that occupy low positions. Included in mapping are the exposed rocks of the highwall.

If properly managed, level areas of Strip mine generally are suitable for pasture. These areas generally are too stony for crops. Unlevel areas and outer slopes should be kept in trees. Onsite investigation is needed to determine the suitability of the spoil for various uses and for different kinds of vegetation. Not assigned to a capability unit or to a woodland suitability subclass.

Tygart Series

The Tygart series consists of deep, somewhat poorly drained soils on terraces, mostly along the major streams of the survey area. The soils formed in acid alluvial material deposited by slackwater and washed from soils that are underlain by sandstone, siltstone, and shale. Slopes range from 0 to 5 percent.

In a representative profile the surface layer is brown silt loam about 6 inches thick. The subsoil is about 40 inches thick. The upper 3 inches is brown, friable heavy silt loam. The middle part is yellowish-brown, firm silty clay loam mottled with gray and strong brown in the upper 8 inches and light brownish-gray, firm silty clay mottled with yellowish brown and dark reddish brown in the lower 15 inches. The lower part is light brownish-gray, very firm silty clay loam about 14 inches thick, that is mottled with yellowish brown and reddish brown. The substratum extends to a depth of 52 inches or more. It is gray silty clay loam mottled with strong brown and reddish brown.

Permeability is slow in the subsoil. Available water capacity is high. The seasonal high water table is at a depth of ½ foot to 1½ feet. Natural fertility is low.

If drained, Tygart soils are suited to most crops commonly grown in the survey area. These soils are used mainly for hay and pasture and are better suited to hay and pasture plants that tolerate some wetness. A seasonal high water table and slow permeability are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Tygart silt loam, in a meadow 800 feet north-northeast of mouth of Buffalo Creek and 150 feet east of State Route 28, in Hampshire County:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; many roots; medium acid; clear, smooth boundary.

B1—6 to 9 inches, brown (10YR 5/3) heavy silt loam; moderate, fine and medium, subangular blocky structure; friable; many roots; medium acid; clear, wavy boundary.

B21t—9 to 17 inches, yellowish-brown (10YR 5/6) silty clay loam; common, medium, distinct, gray (10YR 6/1) and strong-brown (7.5YR 5/8) mottles; strong, medium and coarse, subangular blocky structure; firm; few roots; discontinuous clay films on faces of peds; very strongly acid; clear, wavy boundary.

B22tg—17 to 32 inches, light brownish-gray (10YR 6/2) silty clay; many, medium, prominent, yellowish-brown (10YR 5/6) and dark reddish-brown (5YR 3/4) mottles; weak, medium and coarse, prismatic structure parting to moderate, coarse, subangular blocky; firm; few roots between prisms; common continuous clay films on faces of peds; very strongly acid; clear, wavy boundary.

B3g—32 to 46 inches, light brownish-gray (10YR 6/2) silty clay loam; many, fine, prominent, yellowish-brown (10YR 5/8) and reddish-brown (5YR 4/3) mottles; weak, medium and coarse, prismatic structure parting to weak, coarse, subangular blocky; very firm; many black and dark-red concretions; some gravel; very strongly acid; gradual, wavy boundary.

C—46 to 52 inches +, gray (10YR 6/1) silty clay loam; many, coarse, prominent, strong-brown (7.5YR 5/6) and reddish-brown (5YR 4/3) mottles; massive; very firm; some gravel; very strongly acid.

The solum is 40 to 50 inches thick. Depth to bedrock is

more than 5 feet. In unlimed areas the profile is strongly acid to very strongly acid throughout.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The upper part of the B horizon has hue of 10YR, value of 5, and chroma of 3 to 8 or value of 6 and chroma of 3 or 4, or it has hue of 2.5Y, value of 6, and chroma of 4 or 6. Most of the lower part of the B horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2, but in places it has hue of 2.5Y, value of 6, and chroma of 2. The B horizon is silty clay loam, silty clay, or clay. The middle and lower parts of the profile have mottles of high and low chroma.

Tygart soils are near the well-drained Allegheny soils, the moderately well drained Monongahela soils, and the poorly and very poorly drained Purdy soils. They are not so well drained as Allegheny and Monongahela soils. They are better drained than Purdy soils. They have a finer textured subsoil than Allegheny and Monongahela soils and do not have the fragipan that is characteristic of Monongahela soils.

Tygart silt loam (Tg).—This soil is in depressions and on terraces along the major streams of the survey area. Surface drainage is fair to poor, and in places water is ponded for moderate periods. Included in mapping are a few small areas of Purdy soils, a few small areas of soils that have a fragipan, and a few areas of soils that have a sandy profile.

If adequately drained, this soil is suited to crops commonly grown in the survey area. It is better suited to hay and pasture plants that consist of a mixture of water-tolerant grasses and legumes than to other plants. Delaying pasturing and tilling of this wet soil until it is reasonably dry helps to avoid compaction and loss of tilth. This soil is difficult to drain because it has a fine-textured subsoil. Capability unit IIIw–5; woodland suitability subclass 2w.

Typic Dystrochrepts

These soils are almost completely covered with large stones and boulders, and the underlying soil cannot be described without great difficulty. They are mostly on the Allegheny Plateau in western Mineral County. Areas of Dekalb very stony sandy loam soils are nearby. Slopes range from 0 to 35 percent.

The stony and bouldery surface and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and streets and roads.

Typic Dystrochrepts, stony, rolling (TPC).—These soils are mostly rolling and are almost completely covered with stones and boulders. They are difficult to walk over.

These soils are suited to trees and to wildlife habitat. Because of the stones and boulders, trees are sparse and generally of poor quality. Harvesting operations are slow and require the use of heavy equipment. Capability unit VIIs–4; woodland suitability subclass 5x.

Typic Dystrochrepts, stony, steep (TPE).—These soils are mostly steep and are almost completely covered with stones and boulders. Included in mapping are a few very steep soils.

These soils are suited to trees and to wildlife habitat. They are difficult to manage because of steepness of slope. Because of the stones and boulders, trees are sparse and generally of poor quality. Timber harvesting operations are slow and difficult and require the use of heavy equipment. Capability unit VIIs–4; woodland suitability subclass 5x.

Udifluvents

Udifluvents consist of deep to shallow, excessively drained and well-drained soils on flood plains. They are mostly sand and gravel bars between the banks of the larger streams of the survey area. These soils formed in coarse alluvial material, including gravel and cobblestones. Slopes range from 0 to 3 percent.

Udifluvents formed in stratified materials ranging from light gray to yellow. They are very gravelly and very cobbly sandy loam, loamy sand, and sand. Gravel and cobbly strata also occur.

Permeability is very rapid. Available water capacity is very low. Depth to a well-aerated water table is less than 1 foot in most places. The areas are subject to frequent flooding. Natural fertility is low.

These soils are unstable bars that change in size and shape because of stream erosion and deposition. They are not suited to crops, hay, pasture, and most trees. Susceptibility to frequent flooding, a high water table, and very rapid permeability are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Udifluvents and Fluvaquents, very gravelly (UF).—These soils are on flood plains of larger streams in the survey area. They are excessively drained to very poorly drained. The Udifluvents and the Fluvaquents parts of this mapping unit have the profiles described as representative of their respective series. Most areas consist of both soils, but some areas consist either of Udifluvents or of Fluvaquents.

These soils are suited to wildlife habitat. The low, very gravelly, very cobbly bars lack vegetation, but willow, alder, and sycamore grow on the slightly higher sandy areas. Capability unit VIIIs–6; not placed in a woodland suitability subclass.

Weikert Series

The Weikert series consists of shallow, well-drained soils on uplands in areas throughout the survey area, except the Allegheny Plateau in the western part of Mineral County. The soils formed in acid material weathered from shale, siltstone, and sandstone. Slopes range from 3 to 65 percent.

In a representative profile the surface layer is dark-brown shaly silt loam about 5 inches thick. The subsoil is yellowish-brown, friable very shaly silt loam about 5 inches thick. The substratum extends to a depth of 13 inches. It is yellowish-brown very shaly silt loam underlain by tilted shale bedrock.

Permeability is moderately rapid throughout. Available water capacity is very low. Natural fertility is very low.

The less eroded, gently sloping and strongly sloping Weikert soils are suited to most crops commonly grown in the survey area. Cleared areas are used mainly for pasture. Weikert soils are droughty, and special management is needed to limit soil and water losses and

to maintain fertility and good tilth. Most Weikert soils are better suited to trees. The limited depth to bedrock and steepness of slope are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Weikert shaly silt loam, 8 to 15 percent slopes, severely eroded, in a wooded area 2 miles north of Springfield, 600 yards west of the railroad, in Hampshire County:

Ap—0 to 5 inches, dark-brown (10YR 4/3) shaly silt loam; weak, thin, platy structure; friable; many roots; 30 percent coarse fragments; strongly acid; clear, wavy boundary.

B2—5 to 10 inches, yellowish-brown (10YR 5/6) very shaly silt loam; weak, medium, subangular blocky structure; friable; common roots; 60 percent coarse fragments; strongly acid; clear, wavy boundary.

C—10 to 13 inches, yellowish-brown (10YR 5/6) very shaly silt loam; massive; firm; common roots; 80 percent coarse fragments; strongly acid; clear, wavy boundary.

R—13 inches, tilted olive-brown (2.5YR 4/4) shale.

The solum is 8 to 20 inches thick. Depth to bedrock is 10 to 20 inches. Coarse fragments make up 20 to 40 percent of the A horizon, 35 to 65 percent of the B horizon, and 70 to 85 percent of the C horizon. In unlimed areas the profile is very strongly acid to strongly acid throughout.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6 or hue of 10YR, value of 6, and chroma of 4.

Weikert soils are near the well-drained Berks soils and Edom variant soils. They are shallower than those soils. They contain more coarse fragments in the A and B horizons than the Edom variant soils and are more acid throughout. Their B and C horizons commonly are not so red as those of Edom variant soils.

Weikert shaly silt loam, 3 to 8 percent slopes, severely eroded (WeB3).—This soil is on broad ridgetops and benches of foothills. It has a profile similar to the one described as representative of the series, but it is less sloping and slightly deeper. Erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Berks soils and Edom variant soils. Also included are a few small areas of soils that are less sloping than this soil, a few areas of soils that are less eroded, a few areas of soils that are very shallow, and a few areas of soils that have a reddish profile.

This shallow, droughty soil is not suited to crops but is suited to pasture. The hazard of erosion is very severe in unprotected areas. In places the growth of short-rooted plants is restricted during periods of low rainfall. Many formerly cropped areas have reverted to trees. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIs–32; woodland suitability subclass 6d.

Weikert shaly silt loam, 8 to 15 percent slopes, severely eroded (WeC3).—This soil is on the tops of rounded hills and ridges and on narrow benches along the sides of mountains. It has the profile described as representative of the series. Erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Berks soils and Edom moderately shallow variant soils, a few small areas of soils that are moderately eroded, a few areas of soils that are very shallow, and a few areas of soils that have a reddish profile.

This droughty, shallow soil is not suited to crops and has limited suitability for pasture. The hazard of erosion is very severe in unprotected areas. In places the growth of short-rooted plants is restricted during periods of low rainfall. This soil is better suited to trees and to wildlife habitat than to other purposes. Many formerly cropped areas have reverted to trees. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIIs–32; woodland suitability subclass 6d.

Weikert shaly silt loam, 15 to 25 percent slopes, severely eroded (WeD3).—This soil is on the lower slopes of rounded foothills and on benches along sides of mountains. It has a profile similar to the one described as representative of the series, but it is steeper and shallower. Erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of the Berks soils and Edom soils, moderately shallow variant. Also included are a few small areas of soils that are moderately eroded, a few areas of soils that are very shallow, a few areas of soils that have a reddish profile, and a few small, narrow areas of Fluvaquents along drainageways.

This droughty, shallow soil is not suited to crops and has limited suitability for pasture. The hazard of erosion is very severe in unprotected areas. Pastures are difficult to establish and maintain. Many formerly cropped areas have reverted to trees; Virginia pine is the common species. This soil is better suited to trees and to wildlife habitat than to other purposes. Steepness of slope moderately limits the use of woodland equipment. Capability unit VIIs–32; woodland suitability subclass—north aspect 5d, south aspect 6d.

Weikert shaly silt loam, 25 to 35 percent slopes, severely eroded (WeE3).—This soil is on the sides of mountains and hills. It has a profile similar to the one described as representative of the series, but it is steeper and shallower. Erosion has removed most of the original surface layer, and the subsoil is exposed in places. Included in mapping are a few small areas of Berks soils and Edom variant soils. Also included are a few small areas of soils that are moderately eroded, a few areas of soils that are very shallow, a few areas of soils that have a reddish profile, and a few small, narrow areas of Fluvaquents along drainageways.

This shallow, droughty soil has very limited suitability for pasture and is better suited to trees and to wildlife habitat. The hazard of erosion is very severe in unprotected areas. Pastures are difficult to establish and to maintain. Many formerly cropped areas have reverted to trees. Steepness of slope moderately limits the use of woodland equipment. Capability unit VIIs–32; woodland suitability subclass—north aspect 5d, south aspect 6d.

Weikert shaly silt loam, 35 to 65 percent slopes, severely eroded (WeF3).—This soil is on the sides of mountains and hills. It has a profile similar to the one described as representative of the series, but it is steeper and shallower. Erosion has removed most of

the original surface layer, and the subsoil is exposed in places. Rock outcrops are common in places. Included in mapping are a few small areas of Berks soils and Edom variant soils. Also included are a few small areas of soils that are very shallow, a few areas of soils that have a reddish profile, and a few small, narrow areas of Fluvaquents along drainageways.

This shallow, droughty, and very steep soil is suited to trees and to wildlife habitat. Very steep slopes severely limit the use of woodland equipment. Capability unit VIIs–32; woodland suitability subclass—north aspect 5d, south aspect 6d.

Weikert-Berks complex, 3 to 8 percent slopes (WkB).—This complex is on broad ridgetops and benches. It is about 45 percent Weikert shaly silt loam, about 40 percent Berks channery silt loam, and about 15 percent less extensive soils. The soils have a profile similar to the one described as representative of their respective series, but they are less sloping and slightly deeper. The Weikert part of the complex is also less eroded. Included in mapping are a few small areas of soils that have a sandy loam or loam surface layer and a few areas of soils that are stony.

These soils are suited to crops, hay, and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–32; woodland suitability subclass 4d.

Weikert-Berks complex, 8 to 15 percent slopes (WkC).—This complex is on rounded hills, ridgetops, and narrow benches. It is about 45 percent Weikert shaly silt loam, about 40 percent Berks channery silt loam, and about 15 percent less extensive soils. The Weikert part has a profile similar to the one described as representative of the Weikert series, but it is less eroded and slightly deeper. The Berks part has a profile similar to the one described as representative of the Berks series, but it is less sloping and slightly deeper. Included in mapping are a few small areas of soils that have a loam or sandy loam surface layer and a few areas of soils that are stony.

These soils have limited suitability for crops and are better suited to hay and pasture. Many formerly cropped areas have reverted to trees; Virginia pine is the common species. The hazard of erosion is severe in unprotected areas. Keeping tillage to a minimum, using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IVe–32; woodland suitability subclass 4d.

Weikert-Berks complex, 15 to 25 percent slopes (WkD).—This complex is along the lower slopes of foothills and on some benches. It is about 45 percent Weikert shaly silt loam, about 40 percent Berks channery silt loam, and about 15 percent less extensive soils. The Weikert part has a profile similar to the one described as representative of the Weikert series, but it is steeper and less eroded. The Berks part has a profile similar to the one described as representative of the Berks series, but it is less sloping and slightly deeper. Included in mapping are a few small areas of soils that have a sandy loam or loam surface layer and a few areas of soils that are stony. Also included are narrow areas of Fluvaquents along drainageways.

These soils are not suited to crops but are suited to pasture or trees. Many formerly cropped areas have reverted to trees. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Capability unit VIe–31; woodland suitability subclass—north aspect 4d, south aspect 5d.

Weikert-Berks complex, 25 to 35 percent slopes (WkE).—This complex is on foothills and along sides of mountains. It is about 60 percent Weikert shaly silt loam, about 30 percent Berks channery silt loam, and about 10 percent less extensive soils. The Weikert part has a profile similar to the one described as representative of the Weikert series, but it is steeper and less eroded. The Berks part has the profile described as representative of the Berks series. Included in mapping are a few small areas of soils that have a sandy loam or loam surface layer, a few areas of soils that are stony, and narrow areas of Fluvaquents along drainageways.

These soils have limited suitability for pasture and are better suited to trees and to wildlife habitat. The hazard of erosion is severe in unprotected areas. Good pasture management practices, such as rotational grazing, mowing, and proper stocking, help to control soil and water losses and to maintain fertility. Steepness of slope moderately limits the use of woodland equipment. Capability unit VIIe–3; woodland suitability subclass—north aspect 4d, south aspect 5d.

Weikert-Berks complex, 35 to 65 percent slopes (WkF).—This complex is mostly along north and east sides of hills and mountains. It is about 60 percent Weikert shaly silt loam, about 30 percent Berks channery silt loam, and about 10 percent less extensive soils. The Weikert part of this complex has a profile similar to the one described as representative of the Weikert series, but it is steeper and less eroded. The Berks part has a profile similar to the one described as representative of the Berks series, but it is steeper and slightly shallower. Included in mapping are a few small areas of soils that have a sandy loam or loam surface layer, a few areas of soils that are stony, and narrow areas of Fluvaquents along drainageways.

These soils are not suited to crops, hay, and pasture because of very steep slopes and severe hazard of erosion in unprotected areas. They are better suited to trees and to wildlife habitat than to other uses. Very steep slopes severely limit the use of woodland equipment. Capability unit VIIe–3; woodland suitability subclass—north aspect 4d, south aspect 5d.

Wharton Series

The Wharton series consists of deep, moderately well drained soils on uplands on the Allegheny Plateau in the western part of Mineral County. The soils formed

in acid material weathered from shale and siltstone commonly associated with coal seams. Slopes range from 3 to 15 percent.

In a representative profile the surface layer is brown silt loam about 7 inches thick. The subsoil is about 35 inches thick. The upper 3 inches is yellowish-brown, friable silt loam. The next 19 inches is 7 inches of yellowish-brown, friable silty clay loam over 12 inches of strong-brown, firm silty clay loam mottled with light gray. The lower 13 inches is light-gray, firm shaly silty clay loam mottled with strong brown. The substratum extends to a depth of 48 inches. It is light-gray very shaly silty clay loam mottled with strong brown and yellowish red and is underlain by hard shale and siltstone.

Permeability is slow in the subsoil. Available water capacity is high. The seasonal high water table is at a depth of 1½ to 2 feet. Natural fertility is low to moderate.

The nonstony Wharton soils are suited to crops commonly grown in the survey area. They are used mainly for hay and pasture. Most areas of very stony soils are wooded. Deep-rooted legumes, such as alfalfa, do not grow well on these moderately wet soils. A seasonal high water table, slow permeability, steepness of slope, and moderate shrink-swell potential are the main limitations to use of these soils for homesites, septic tank absorption fields, and roads and streets.

Representative profile of Wharton silt loam, 3 to 8 percent slopes, in a wooded area on north side of State Route 4/1, about 1½ miles above its junction with State Route 42/3, in Mineral County:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; moderate, fine, granular structure; very friable; many roots; 10 percent coarse fragments; strongly acid; clear, smooth boundary.

B1—7 to 10 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, subangular blocky structure; friable; many roots; few black coatings on faces of peds; 10 percent coarse fragments; strongly acid; clear, smooth boundary.

B21t—10 to 17 inches, yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; common roots; few discontinuous clay films on faces of peds; 15 percent coarse fragments; very strongly acid; clear, smooth boundary.

B22t—17 to 29 inches, strong-brown (7.5YR 5/6) silty clay loam; many, medium, distinct, light-gray (N 6/0) mottles; weak, medium, prismatic structure parting to moderate, medium, subangular blocky; firm; few roots; common, continuous, light brownish-gray (2.5Y 6/2) clay films on faces of peds; few black streaks and films; 15 percent coarse fragments; strongly acid; gradual, wavy boundary.

B3tg—29 to 42 inches, light-gray (N 6/0) shaly silty clay loam; many, coarse, distinct, strong-brown (7.5YR 5/6) mottles; massive; firm; few discontinuous, light brownish-gray (2.5Y 6/2) clay films on faces of peds; common black streaks and films; 30 percent coarse fragments; very strongly acid; gradual, smooth boundary.

C—42 to 48 inches, light-gray (N 6/0) very shaly silty clay loam; few, coarse, distinct, strong-brown (7.5YR 5/6) and yellowish-red (5YR 4/6) mottles; massive; firm; 70 percent coarse fragments; very strongly acid; clear, wavy boundary.

R—48 inches, hard shale and siltstone.

The solum is 40 to 60 inches thick. Depth to bedrock is 3½ to 6 feet. Coarse fragments make up 0 to 15 percent of the upper part of the B horizon, 10 to 40 percent of the B3 horizon, and as much as 90 percent of the C horizon. In unlimed areas the profile is strongly acid to very strongly acid in the A and B horizons and very strongly acid in the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A horizon is silt loam and very stony silt loam. The B horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 to 8 and includes hue of 10YR, value of 5 or 6, and chroma of 1 or hue of N, value of 5 or 6, and chroma of 0. It is silty clay loam, clay loam, clay, or their shaly analogs, but the B1 horizons are silt loam. The lower part of the B horizon and the C horizon have mottles of high and low chroma.

Wharton soils are near the well-drained Gilpin soils. They are deeper and less well drained than Gilpin soils, and they generally have a finer textured B horizon.

Wharton silt loam, 3 to 8 percent slopes (WnB).—This soil is on the less sloping parts of ridges and broad benches of the Allegheny Plateau. It has the profile described as representative of the series. Included in mapping are a few small areas of Gilpin soils, a few small areas of soils that are deep and well drained, a few areas of soils that are less sloping than this Wharton soil, and a few areas of soils that are poorly drained.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is moderate in unprotected areas. Using contour cultivation, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIe–13; woodland suitability subclass 2w.

Wharton silt loam, 8 to 15 percent slopes (WnC).—This soil is on the more rounded ridgetops and benches of the Allegheny Plateau. It has a profile similar to the one described as representative of the series, but it is steeper. Included in mapping are a few small areas of Gilpin soils, a few small areas of soils that are deep and well drained, and a few areas of soils that are poorly drained.

This soil is suited to crops commonly grown in the survey area and to hay and pasture. The hazard of erosion is severe in unprotected areas. Using contour cultivation and contour stripcropping, returning crop residue to the soil, maintaining sod in natural drainageways, and including hay in the cropping system are practices that help to control erosion and to maintain fertility and good tilth. Capability unit IIIe–13; woodland suitability subclass 2w.

Wharton very stony silt loam, 3 to 15 percent slopes (WoC).—This soil is only in Mineral County. It is on broad benches and ridgetops on the Allegheny Plateau. It has a profile similar to the one described as representative of the series, but it has a very stony surface. Included in mapping are a few small areas of soils that have a surface layer of very stony loam or very stony sandy loam; a few areas of very stony soils that are somewhat poorly drained; a few areas of very stony soils that are poorly drained; and long, narrow "rock trains" of sandstone rubble.

This very stony soil is not suited to crops and hay but is suited to pasture. The hazard of erosion is moderate in unprotected areas. Good pasture management practices, such as rotational grazing, mowing,

and proper stocking, help to control soil and water losses and to maintain fertility. The very stony surface restricts the use of farm machinery. Capability unit VIs–2; woodland suitability subclass 2w.

Use and Management of the Soils

In this section, general guidelines for the management of soils for crops and pasture are described, and the system of capability classification used by the Soil Conservation Service is explained. In addition, the estimated yields of principal crops and pasture grasses grown in Hampshire, Mineral, and Morgan Counties are given, and information on the use and management of the soils in the survey area for woodland, wildlife, engineering, and town and country planning is provided.

Management of Soils for Crops and Pasture

The major crops grown in Hampshire, Mineral, and Morgan counties are corn, small grain, grasses and legumes, and orchard fruits.

Controlling erosion and building and maintaining fertility are the main management concerns in the survey area. In addition, artificial drainage is needed on some of the wet soils. Many very stony areas are used for woodland.

On the Appalachian Plateau, the short growing season and wetness in spring preclude extensive production of row crops. Small grain, hay, pasture plants, and trees grow well in this area. A few stands of trees are managed for woodcrop production.

In the Ridge and Valley Region of the survey area, low rainfall in parts of Mineral and Hampshire Counties must be considered when managing soils for crops and pasture. Corn and other crops grow well on such soils as Huntington, Chagrin, and Lindside soils, which are on flood plains. These crops also grow well on the Pope and Philo soils but commonly require more lime and fertilizer. Flooding of areas near the larger streams does not materially hinder crop production. Drainage is needed on wet soils of the flood plains, terraces, and foot slopes, such as Atkins, Melvin, Purdy, Brinkerton, and Andover soils.

Soils on river terraces, such as Allegheny and Braddock soils, are suited to most crops that have few management problems. The gently sloping and strongly sloping soils require practices that control erosion.

Soils on uplands, such as Berks, Lehew, and Weikert soils, are droughty and erodible and have low or very low natural fertility. Some of these soils are in the low-rainfall area. Suitable practices for controlling erosion are minimum tillage, contour cultivation, contour stripcropping, return of crop residue to the soil, maintenance of natural sod drainageways, inclusion of hay in the cropping system, and application of lime and fertilizer. Applying animal manure and returning crop residue to the soil help to build and maintain organic-matter content, improve tilth, and reduce runoff.

A large acreage of hay and pasture is in the three counties. Common grass-legume mixtures include alfalfa, orchardgrass, timothy, bromegrass, and red clover. Alsike clover, birdsfoot trefoil, and fescue are also grown. Winter grazing of fescue is practiced on several farms. Alfalfa grows better on well-drained soils, such as Huntington or Murrill soils, than on wet soils, such as Melvin or Brinkerton soils.

Fruit orchards occupy about 6,100 acres in the three counties. Orchard trees grow better on deep, well-drained, nearly level to moderately steep soils that have high or moderate available water capacity. Examples of such soils are Braddock, Elliber, Laidig, and Murrill soils. Also important are good air drainage and the direction of exposure, or aspect.

Apples are the main orchard fruit grown in the survey area. Peaches, plums, pears, and cherries are grown in much smaller quantities. Many orchardists sell to truckers directly from the field. The larger orchards have cold storage or quick-cold processing that permits storage of fruit for more favorable post-season prices. Weather is the orchardist's greatest friend and enemy. Late spring frosts and hail are two of the most uncontrollable factors. Larger growers who have established markets over the years seem to be better able to withstand market changes.

Capability grouping

Some readers, particularly those who farm on a large scale, may find it practical to use and manage alike some of the different kinds of soil on their farm. These readers can make good use of the capability classification system, a grouping that shows, in a general way, the suitability of soils for most kinds of farming.

The grouping is based on limitations of soils when used for field crops, the risk of damage when they are farmed, and the way the soils respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations for range, for forest trees, or for engineering.

In the capability system, all kinds of soil are grouped at three levels: the class, the subclass, and the unit. The eight classes in the capability system and the subclasses and units represented in Hampshire, Mineral, and Morgan Counties are described in the list that follows.

CAPABILITY CLASSES are the broadest grouping and are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, so shallow, or otherwise so limited that they do not produce worthwhile yields of crops, forage, or wood products.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–4 or IIIe–10. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Following is a descriptive outline of the system as it applies to Hampshire, Mineral, and Morgan Counties. Specific information on the use and management of the individual soils for crops and pasture is given in the section "Descriptions of the Soils." To find the capability unit in which each soil has been placed, refer to the Guide to Mapping Units at the back of this survey.

Class I. Soils that have few limitations that restrict their use. (no subclasses)
- Unit I–6. Nearly level, deep, well-drained loams that formed in lime-influenced alluvium.

Class II. Soils that have moderate limitations that reduce the choice of plants or require moderate conservation practices.
- Subclass IIe. Soils that are subject to moderate erosion unless protected.
  - Unit IIe–1. Gently sloping, deep, well-drained soils that formed in a mantle of acid colluvium underlain by material weathered from limestone.
  - Unit IIe–4. Gently sloping, deep, well-drained loams, silt loams, and fine sandy loams that formed in acid alluvium or acid colluvium weathered from sandstone, siltstone, and shale.
  - Unit IIe–10. Gently sloping, moderately deep, well-drained silt loams that formed in acid material weathered from shale, siltstone, and sandstone.
  - Unit IIe–12. Gently sloping, moderately deep, well-drained fine sandy loams and silt loams that formed in acid materials weathered from sandstone, siltstone, and shale.
  - Unit IIe–13. Gently sloping, deep, moderately well drained silt loams and loams that formed in acid material weathered from shale, siltstone, and sandstone and have a fragipan or claypan.
  - Unit IIe–14. Gently sloping, deep, moderately well drained and somewhat poorly drained silt loams that formed in lime-influenced material and have a fragipan.
- Subclass IIw. Soils that are moderately limited because of excess water.
  - Unit IIw–1. Nearly level, deep, moderately well drained silt loams that formed in acid old alluvium. These soils pond. Seep spots are common.
  - Unit IIw–6. Nearly level, deep, well-drained fine sandy loams, sandy loams, and silt loams that formed in recent alluvium. These soils are subject to flooding.
  - Unit IIw–7. Nearly level, deep, moderately well drained silt loams, loams, and sandy loams that formed in recent alluvium. These soils are subject to flooding.

Class III. Soils that have severe limitations that reduce the choice of plants or require special conservation practices, or both.
- Subclass IIIe. Soils that are subject to severe erosion if they are cultivated and not protected.
  - Unit IIIe–1. Strongly sloping, deep, well-drained loams that formed in a mantle of acid colluvium underlain by material weathered from limestone.
  - Unit IIIe–4. Strongly sloping, deep, well-drained loams and silt loams that formed in acid alluvium or acid colluvium weathered from sandstone, siltstone, and shale.
  - Unit IIIe–10. Strongly sloping, moderately deep, well-drained silt loams that formed in acid material weathered from shale, siltstone, and sandstone.
  - Unit IIIe–11. Strongly sloping, deep, well-drained silt loams that formed in material weathered from shaly limestone and calcareous shale.
  - Unit IIIe–12. Gently sloping or severely eroded and strongly sloping, moderately deep, well-drained fine sandy loams and silt loams that formed in acid material weathered from sandstone, siltstone, and shale.
  - Unit IIIe–13. Strongly sloping, deep, moderately well drained silt loams and loams that formed in acid material weathered from shale, siltstone, and sandstone and have a fragipan or claypan.
  - Unit IIIe–14. Strongly sloping, deep, moderately well drained and somewhat poorly

drained silt loams that formed in lime-influenced material and have a fragipan.

Unit IIIe–32. Gently sloping, shallow and moderately deep, well-drained silt loams that formed in acid material weathered mostly from shale and siltstone. These soils are droughty.

Subclass IIIw. Soils that are severely limited for cultivation because of excess water.

Unit IIIw–1. Nearly level, deep, poorly drained silt loams that formed in recent alluvium. These soils are frequently flooded.

Unit IIIw–5. Nearly level, deep, somewhat poorly drained silt loams that formed in clayey or moderately fine textured acid slack water deposits on stream terraces.

Class IV. Soils that have very severe limitations that reduce the choice of plants or require very careful management, or both.

Subclass IVe. Soils that are subject to very severe erosion if they are cultivated and not protected.

Unit IVe–1. Moderately steep, deep, well-drained loams that formed in a mantle of acid colluvium underlain by material weathered from limestone.

Unit IVe–3. Strongly sloping and moderately steep, moderately deep and deep, well-drained silt loams that formed in acid material weathered from shale, siltstone, and sandstone.

Unit IVe–5. Strongly sloping and moderately steep, moderately deep, well-drained fine sandy loams and silt loams that formed in acid material weathered from sandstone, siltstone, and shale.

Unit IVe–9. Strongly sloping, severely eroded, deep, moderately well drained silt loams that formed in old acid alluvium weathered from sandstone, siltstone, and shale and have a fragipan. These soils have seep spots.

Unit IVe–11. Strongly sloping and moderately steep, deep and moderately deep, well-drained silt loams and silty clay loams that formed in material weathered from limy shale.

Unit IVe–31. Strongly sloping, moderately deep, well-drained silt loams that formed in material weathered from shaly limestone and calcareous shale.

Unit IVe–32. Strongly sloping, shallow and moderately deep, well-drained silt loams that formed in acid material weathered mostly from shale and siltstone. These soils are droughty.

Subclass IVw. Soils that are very severely limited by excess wetness.

Unit IVw–1. Nearly level, deep, poorly drained silty clay loams that formed in recent alluvium. These soils flood.

Unit IVw–5. Gently sloping, deep, poorly drained silt loams that formed in acid colluvium weathered from shale, limestone, and sandstone and have a fragipan.

Subclass IVs. Soils that are very severely limited by coarse-fragment content.

Unit IVs–26. Strongly sloping, deep, well-drained very cherty loams that formed in acid material weathered from cherty limestone.

Class V. Soils that are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife habitat. No Class V soils are mapped in Hampshire, Mineral, or Morgan Counties.

Class VI. Soils that have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife habitat.

Subclass VIe. Soils that are severely limited, chiefly by hazard of erosion, unless protective cover is maintained.

Unit VIe–1. Moderately steep or severely eroded and steep, deep, well-drained silt loams and silty clay loams that formed in material weathered from shaly limestone and calcareous shale.

Unit VIe–2. Moderately steep or severely eroded and steep, moderately deep, well-drained silt loams and fine sandy loams that formed in acid material weathered from shale, siltstone, and sandstone.

Unit VIe–31. Strongly sloping or severely eroded and moderately steep, shallow to deep, well-drained silt loams and silty clay loams that formed in material weathered from shale and siltstone. These soils are somewhat droughty.

Subclass VIw. Soils that are severely limited by excess water and are generally unsuitable for cultivation.

Unit VIw–1. Nearly level, deep to shallow, poorly drained to somewhat poorly drained light silty clay loams to loams that formed in recent alluvium. These soils are frequently flooded.

Subclass VIs. Soils that are generally unsuited to cultivation and limited for other uses by their low available water capacity, stones, or other features.

Unit VIs–1. Gently sloping to moderately steep, deep to shallow, well drained and moderately well drained, very stony and very rocky silt loams and silty clay loams that formed in lime-influenced material.

Unit VIs–2. Gently sloping to moderately steep, deep, moderately well drained and well drained very stony silt loams that formed in acid material.

Unit VIs–26. Moderately steep, deep, well-drained very cherty loams that formed in acid material weathered from cherty limestone.

Unit VIs–32. Gently sloping, severely eroded, shallow, well-drained shaly silt loams

that formed in acid material weathered mainly from shale and siltstone.

Class VII. Soils that have very severe limitations that make them unsuited to cultivation and restrict their use largely to grazing, woodland, or wildlife habitat.

Subclass VIIe. Soils that are very severely limited, chiefly by risk of erosion, unless protective cover is maintained.

Unit VIIe–1. Steep and very steep, severely eroded, deep, well-drained silty clay loams that formed in material weathered from shaly sandstone and calcareous shale.

Unit VIIe–2. Steep and very steep, moderately deep, well-drained fine sandy loams and silt loams that formed in acid material weathered from sandstone, siltstone, and shale.

Unit VIIe–3. Moderately steep to very steep, severely eroded, shallow to moderately deep, well-drained silt loams and silty clay loams that formed in acid material weathered mainly from shale and siltstone.

Subclass VIIs. Soils that are very severely limited by low available water capacity, stones, or other soil features.

Unit VIIs–1. Strongly sloping to very steep, deep to shallow, well-drained very stony loams, very rocky silty clays, and silty clay loams that formed in lime-influenced material.

Unit VIIs–2. Gently sloping to very steep, moderately deep, well-drained very stony sandy loams and very stony loamy sands that formed in acid material weathered mainly from sandstone and siltstone.

Unit VIIs–4. Gently sloping to very steep, shallow to deep, well-drained and excessively drained extremely stony sandy loams, extremely stony loams, and extremely stony silt loams that formed in material weathered from shale, siltstone, and sandstone.

Unit VIIs–5. Gently sloping, deep, poorly drained very stony loams and very stony silt loams that formed in acid material weathered from sandstone, siltstone, and shale.

Unit VIIs–26. Steep, deep, well-drained very cherty loams that formed in acid material weathered from cherty limestone.

Unit VIIs–32. Strongly sloping to very steep, shallow, well-drained shaly silt loams that formed in acid material weathered mainly from shale and siltstone.

Class VIII. Soils and landforms that have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife habitat, water supply, or esthetic purposes.

Subclass VIIIe. Soils that are extremely limited, chiefly by risk of erosion, unless protective cover is maintained.

Unit VIIIe–31. Mostly steep and very steep, very shallow, excessively drained, acid shale material or exposed bedrock.

Subclass VIIIs. Stony land and other areas that have little potential for commercial crop production.

Unit VIIIs–1. Rubble land.

Unit VIIIs–6. Riverwash.

Estimated yields

Table 2 shows the estimated yields of the principal crops commonly grown in Hampshire, Mineral, and Morgan Counties. Yields are estimated for two levels of management and are listed under columns A and B. Yields in columns A are estimated for the management now used by farmers. Those in columns B are estimated for the best management practical on the soils, including proper kinds and amounts of fertilizer.

Yields are based on records kept by farmers in the counties, on recent reports of the U.S. Census of Agriculture, and on the observation and experience of representatives of the Soil Conservation Service and others who have a knowledge of the soils and crops in the survey area. The yields shown are averages that can be expected over a period of years. In any one year, yields may be affected by several factors, such as favorable or unfavorable weather, plant diseases, or insects.

The management needed to obtain the yields in columns B includes liming to the pH required for the crop, applying fertilizer according to needs determined by soil tests, choosing a suitable cropping system, and using necessary soil and water conservation practices, including drainage. Animal residue generally is not used extensively, except on dairy farms.

The management needed to obtain the estimated yields in columns B for pasture includes the use of enough fertilizer to provide phosphate and potash as needed and enough lime to maintain a pH of 6.0 to 6.5. Irrigation was not considered.

The response to improved management is better on deep soils in the Huntington series that have a favorable soil texture and high available moisture capacity than on soils in the Opequon series that are relatively high in natural fertility but have poor physical properties.

Woodland [2]

About 569,000 acres, or 74 percent, of the total land area of the survey area is woodland. All except 17,300 acres is privately owned, and only 5,800 acres is noncommercial forest (*4*). Woodland tracts range from small farm woodlots to large corporate ownerships of several thousand acres. The largest woodland tracts are in the western third of the survey area.

The most common forest types, or natural associations of tree species, and their percentage of the wooded area, are the oak-hickory type, about 74 percent; the maple-beech-birch type, about 17 percent; other hardwood types, about 3 percent; and pine types, about 6 percent (*4*).

Most of the maple-beech-birch forest type occurs on the Allegheny Plateau area of Mineral County and on the upper slopes of mountains in Hampshire and Mor-

[2] JOHN L. GORMAN, woodland conservationist, Soil Conservation Service, assisted in preparing this section.

TABLE 2.—*Estimated average acre yields of principal crops under two levels of management*

[Yields in columns A are those expected under ordinary management; those in columns B are expected under improved management. Absence of figure indicates crop is not commonly grown or is not suited to the soil at the specified level of management. Soils that are severely limited by steep slopes, stoniness, rockiness, or very severe erosion are not suited to crops and are not considered in this table]

Soil	Grain						Hay				Pasture			
	Corn		Oats		Wheat		Alfalfa-grass		Clover-grass		Permanent bluegrass		Tall grass	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu	*Bu*	*Bu*	*Bu*	*Bu*	*Bu*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Albrights silt loam, 3 to 8 percent slopes	55	100	35	70	25	40	1.8	3.5	1.7	3.0	70	135	95	200
Albrights silt loam, 8 to 15 percent slopes	50	95	35	65	25	40	1.8	3.5	1.6	3.0	63	135	89	200
Allegheny fine sandy loam, 3 to 8 percent slopes	70	115	45	75	35	45	3.3	4.5	2.1	3.5	90	150	135	255
Allegheny silt loam, 3 to 8 percent slopes	75	120	45	75	35	45	3.4	4.5	2.2	3.5	95	160	135	255
Allegheny silt loam, 8 to 15 percent slopes	65	110	40	70	30	40	3.2	4.0	1.9	3.0	80	135	110	230
Andover and Brinkerton very stony soils, 3 to 8 percent slopes [2]	--	---	--	--	--	--	--	--	--	--	50	70	---	---
Atkins silt loam	50	100	30	60	20	30	--	--	1.7	3.0	65	135	94	170
Atkins silty clay loam	--	---	--	--	--	--	--	--	-	--	50	90	---	---
Berks channery silt loam, 3 to 8 percent slopes	35	80	30	60	20	35	2.6	3.4	1.8	2.8	80	135	109	200
Berks channery silt loam, 8 to 15 percent slopes	35	75	30	55	20	35	2.4	3.2	1.7	2.7	75	115	98	170
Berks channery silt loam, 8 to 15 percent slopes, severely eroded	30	70	25	50	15	25	2.2	3.0	1.5	2.5	63	114	86	170
Berks channery silt loam, 15 to 25 percent slopes	30	70	25	50	15	30	2.2	3.1	1.5	2.2	69	90	92	170
Berks channery silt loam, 15 to 25 percent slopes, severely eroded	--	---	--	--	--	--	--	--	--	--	30	75	---	---
Berks channery silt loam, 25 to 35 percent slopes	--	---	--	--	--	--	--	--	--	--	30	80	---	---
Berks shaly silt loam, 3 to 8 percent slopes	40	80	40	60	20	35	2.6	3.5	1.8	3.0	80	135	110	200
Berks shaly silt loam, 8 to 15 percent slopes	40	75	30	55	20	35	2.4	3.2	1.6	2.5	62	115	80	170
Berks shaly silt loam, 8 to 15 percent slopes, severely eroded	25	70	20	50	10	20	2.2	3.0	1.4	2.0	52	90	69	170
Berks shaly silt loam, 15 to 25 percent slopes	30	70	25	50	15	25	2.2	3.0	1.4	2.0	57	90	74	170
Braddock gravelly loam, 3 to 8 percent slopes	70	115	45	75	35	45	3.4	4.5	2.2	3.5	95	160	135	235
Braddock gravelly loam, 8 to 15 percent slopes	60	105	40	70	30	40	3.2	4.0	1.9	3.0	80	135	110	230
Brinkerton silt loam, 3 to 8 percent slopes	40	90	30	60	20	30	--	--	1.5	2.4	78	115	80	145
Buchanan channery loam, 3 to 8 percent slopes	55	100	35	65	25	40	1.8	3.5	1.7	3.1	70	135	95	200
Buchanan channery loam, 8 to 15 percent slopes	50	90	35	60	25	35	1.8	3.5	1.6	3.0	63	135	89	200
Buchanan very stony loam, 3 to 15 percent slopes	--	---	--	-		--	--	--	--	--	50	110	---	---
Buchanan very stony loam, 15 to 25 percent slopes	--	---	--	--	--	--	--	--	--	--	35	90	---	---
Calvin channery silt loam, 8 to 25 percent slopes	35	75	30	55	20	35	2.4	3.0	1.7	2.5	75	115	98	170
Calvin silt loam, 15 to 25 percent slopes	30	70	25	50	15	30	2.2	3.0	1.5	2.0	69	100	92	170
Chagrin fine sandy loam	80	135	50	80	40	50	3.5	5.0	2.3	3.5	100	160	150	285
Clarksburg channery silt loam, 3 to 8 percent slopes	60	100	40	70	30	40	1.9	3.5	1.9	3.0	80	135	108	200
Clarksburg channery silt loam, 8 to 15 percent slopes	55	90	40	65	30	40	1.9	3.5	1.8	3.0	71	135	102	200
Clarksburg very stony silt loam, 3 to 15 percent slopes	--	---	--	--	--	--	--	--	--	--	65	115	---	---
Clarksburg very stony silt loam, 15 to 25 percent slopes	--	---	--	--	--	--	--	--	--	--	58	85	-	--
Dunning silty clay loam	60	90	--	--	--	--	--	--	1.8	3.0	80	125	115	170
Edom silt loam, 8 to 15 percent slopes	60	90	35	65	25	35	2.1	3.5	1.8	3.0	90	135	134	200
Edom silt loam, 15 to 25 percent slopes	50	80	30	60	20	35	1.9	3.0	1.6	2.5	79	115	125	170
Edom silt loam, 25 to 35 percent slopes	--	---		--			-	--	--	--	60	90	---	---
Edom silty clay loam, 8 to 15 percent slopes, severely eroded	45	80	30	60	20	35	1.8	3.0	1.6	2.5	79	115	117	170
Edom silty clay loam, 15 to 25 percent slopes, severely eroded	--	---	--	--	--	--	--	--	--	--	65	90	---	---
Edom silt loam, moderately shallow variant, 8 to 15 percent slopes	--	---	25	45	10	30	1.1	3.6	1.0	2.8	50	131	80	194
Edom silt loam, moderately shallow variant, 15 to 25 percent slopes	--	---	--	---	--	--	--	--	--	--	30	58	---	---

TABLE 2.—*Estimated average acre yields of principal crops under two levels of management*—Continued

Soil	Grain						Hay				Pasture			
	Corn		Oats		Wheat		Alfalfa-grass		Clover-grass		Permanent bluegrass		Tall grass	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu	*Bu*	*Bu*	*Bu*	*Bu*	*Bu*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Edom silty clay loam, moderately shallow variant, 8 to 15 percent slopes, severely eroded	--	---	--	---	--	--	--	--	--	--	30	58	---	---
Elliber very cherty loam, 8 to 15 percent slopes	60	95	35	60	20	35	2.3	3.5	1.3	2.5	97	100	115	200
Elliber very cherty loam, 15 to 25 percent slopes	60	85	35	60	20	30	2.1	3.0	1.0	2.0	87	90	---	---
Ernest silt loam, 3 to 8 percent slopes	55	100	35	65	20	40	1.8	3.5	1.7	3.0	70	135	95	200
Ernest silt loam, 8 to 15 percent slopes	50	90	35	55	20	35	1.8	3.5	1.6	3.0	63	135	89	200
Ernest very stony silt loam	--	---	--	--	--	--	--	--	--	--	40	90	---	---
Fluvaquents	--	---	--	--	--	--	--	--	--	--	50	80	---	---
Gilpin silt loam, 3 to 8 percent slopes	40	90	30	65	20	40	1.4	3.5	1.3	3.0	75	135	105	200
Gilpin silt loam, 8 to 15 percent slopes	38	85	30	60	20	35	1.2	3.5	1.2	3.0	70	135	100	200
Gilpin silt loam, 15 to 25 percent slopes	32	80	25	55	20	30	.7	3.0	1.1	2.5	60	115	92	170
Gilpin silt loam, 25 to 35 percent slopes	--	---	--	--	--	--	--	--	--	--	55	95	---	---
Huntington loam	80	135	50	80	40	50	3.5	5.0	2.3	3.5	110	160	160	285
Laidig channery loam, 3 to 8 percent slopes	65	100	45	70	25	40	2.9	4.0	2.0	3.0	85	135	117	230
Laidig channery loam, 8 to 15 percent slopes	60	95	45	65	25	35	2.9	4.0	2.0	3.0	80	135	115	230
Laidig channery loam, 15 to 25 percent slopes	55	85	40	60	20	30	2.7	3.5	1.9	2.5	70	115	110	200
Laidig very stony loam, 3 to 15 percent slopes	--	---	--	--	--	--	--	--	--	--	50	114	---	---
Laidig very stony loam, 15 to 25 percent slopes	--	---	--	--	--	--	--	--	--	--	35	108	---	---
Lehew channery fine sandy loam, 3 to 8 percent slopes	35	75	25	55	15	30	1.3	3.0	1.1	2.5	60	130	84	190
Lehew channery fine sandy loam, 3 to 8 percent slopes, severely eroded	35	70	25	50	15	30	1.0	2.5	1.0	2.0	50	110	66	165
Lehew channery fine sandy loam, 8 to 15 percent slopes	35	70	25	50	15	30	1.0	2.5	1.0	2.0	50	110	66	165
Lehew channery fine sandy loam, 8 to 15 percent slopes, severely eroded	25	60	20	35	10	20	.6	2.0	.8	2.0	37	75	46	135
Lehew channery fine sandy loam, 15 to 25 percent slopes	30	65	20	45	12	25	.8	2.5	.9	2.0	45	85	52	160
Lehew channery fine sandy loam, 15 to 25 percent slopes, severely eroded	--	---	--	--	--	--	--	--	--	--	23	65	---	---
Lehew-Berks complex, 3 to 8 percent slopes [2]	40	80	30	60	15	35	1.8	3.5	1.3	3.5	70	135	90	200
Lehew-Berks complex, 3 to 8 percent slopes, severely eroded [2]	40	75	25	55	15	35	1.5	3.0	1.1	2.5	58	115	70	170
Lehew-Berks complex, 8 to 15 percent slopes [2]	40	75	25	55	15	35	1.5	3.0	1.1	2.5	58	115	70	170
Lehew-Berks complex, 8 to 15 percent slopes, severely eroded [2]	25	65	20	40	10	25	1.0	2.5	.8	2.0	44	80	50	140
Lehew-Berks complex, 15 to 25 percent slopes [2]	30	70	20	50	12	30	1.3	3.0	1.0	2.0	52	90	60	170
Lehew-Berks complex, 15 to 25 percent slopes, severely eroded [2]	--	---	--	--	--	--	--	--	--	--	40	75	---	---
Lehew-Dekalb flaggy fine sandy loams, 8 to 15 percent slopes [2]	35	60	25	50	15	20	1.0	2.5	1.0	2.0	50	110	66	165
Lehew-Dekalb flaggy fine sandy loams, 15 to 25 percent slopes [2]	30	65	20	45	12	25	.8	2.5	.9	2.0	45	75	52	160
Lindside silt loam	65	130	35	80	25	45	2.1	4.5	2.3	3.5	100	160	179	255
Melvin silt loam	60	115	35	70	20	35	--	--	2.0	3.0	82	135	102	170
Monongahela silt loam, 0 to 3 percent slopes	50	95	35	60	20	35	1.6	3.0	1.6	3.0	63	130	89	195
Monongahela silt loam, 3 to 8 percent slopes	55	100	40	65	20	40	1.8	3.5	1.7	3.0	70	135	95	200
Monongahela silt loam, 8 to 15 percent slopes	50	90	35	60	20	35	1.8	3.0	1.6	2.5	63	130	89	170
Monongahela silt loam, 8 to 15 percent slopes, severely eroded	45	85	30	60	15	35	1.4	3.0	1.2	2.5	50	115	72	170
Murrill channery loam, 3 to 8 percent slopes	75	120	45	65	30	45	3.1	4.5	2.3	3.0	110	160	180	255
Murrill channery loam, 8 to 15 percent slopes	65	110	40	60	30	40	3.0	4.0	2.2	3.0	87	135	172	230
Murrill channery loam, 15 to 25 percent slopes	55	95	40	60	25	35	3.0	4.0	2.1	3.0	82	135	166	230
Murrill very stony loam, 3 to 15 percent slopes	--	---	--	--	--	--	--	--	--	--	92	114	---	--
Murrill very stony loam, 15 to 25 percent slopes	--	---	--	--	--	--	--	--	--	--	86	108	---	---
Murrill channery loam, clayey subsoil variant, 3 to 8 percent slopes	80	125	50	70	35	50	3.3	4.5	2.4	3.5	115	170	190	265

TABLE 2.—*Estimated average acre yields of principal crops under two levels of management*—Continued

Soil	Grain						Hay				Pasture			
	Corn		Oats		Wheat		Alfalfa-grass		Clover-grass		Permanent bluegrass		Tall grass	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu	*Bu*	*Bu*	*Bu*	*Bu*	*Bu*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Murrill channery loam, clayey subsoil variant, 8 to 15 percent slopes	70	115	50	65	35	50	3.2	4.0	2.4	3.5	100	145	178	240
Murrill channery loam, clayey subsoil variant, 15 to 25 percent slopes	65	100	40	60	25	40	3.1	4.0	2.2	3.0	88	135	165	230
Opequon-Rock outcrop complex, 8 to 25 percent slopes	--	--	--	--	--	--	--	--	--	--	90	90	--	--
Philo fine sandy loam	65	130	35	80	20	45	1.9	4.5	2.1	3.5	94	160	164	225
Philo gravelly loam	--	--	--	--	--	--	--	--	--	--	85	150	160	220
Philo silt loam	65	130	35	80	20	45	2.0	4.5	2.1	3.5	100	160	170	225
Pope fine sandy loam	60	135	35	80	20	50	2.1	5.0	1.9	3.5	78	160	165	285
Pope silt loam	65	140	40	85	20	55	2.2	5.0	2.0	4.0	93	165	179	295
Pope gravelly sandy loam	55	125	30	75	20	45	2.0	5.0	1.8	3.5	70	155	160	275
Purdy silty clay loam	--	80	--	55	--	--	--	--	1.0	2.5	40	115	70	145
Rushtown shaly silt loam, 8 to 25 percent slopes	--	--	--	--	--	--	--	--	--	--	45	115	--	--
Tygart silt loam	45	95	30	60	20	30	1.0	3.0	1.9	3.0	70	135	98	170
Weikert shaly silt loam, 3 to 8 percent slopes, severely eroded	--	--	--	--	--	--	--	--	--	--	20	75	--	--
Weikert-Berks complex, 3 to 8 percent slopes [2]	30	60	20	50	10	25	1.3	2.3	1.2	2.0	65	90	90	115
Weikert-Berks complex, 8 to 15 percent slopes [2]	30	55	20	40	10	25	1.2	2.2	1.1	2.0	55	90	75	115
Weikert-Berks complex, 15 to 25 percent slopes [2]	--	--	--	--	--	--	--	--	--	--	--	60	--	--
Wharton silt loam, 3 to 8 percent slopes	55	80	35	70	20	40	1.6	3.0	1.6	3.5	95	165	115	190
Wharton silt loam, 8 to 15 percent slopes	55	75	35	70	20	40	1.5	2.9	1.5	3.5	90	160	105	175
Wharton very stony silt loam, 3 to 15 percent slopes	--	--	--	--	--	--	--	--	--	--	75	100	--	--

[1] Cow-acre-days refers to the number of days in a year one cow, horse, or steer or seven sheep can graze an acre without injury to pasture.
[2] Yields are essentially the same for each component.

gan Counties. Christmas trees are now grown to a considerable extent in the survey area.

The occurrence of very large acreages of soils that have low or very low available water capacity and a limited rainfall limit the potential productivity of the soils for tree crops in much of the Ridge and Valley area. About one-third of the acreage of the survey area is in woodland suitability classes 1, 2, and 3 and has *good* to *excellent* production potential; one-third is in woodland suitability class 4 and has *fair* production potential; and the rest is in woodland suitability classes 5 and 6 and has *poor* and *very poor* production potential.

Many pine and hardwood trees used for pulpwood grow on the soils that have the poorest production potential. This pulpwood is marketed at a paper plant at Luke, Maryland. Woodland wildlife management on these sites, especially management for deer and wild turkey, is becoming more important to the economy of the survey area.

Soil properties have a strong influence on tree species, tree growth, and woodland management. Differences in soil depth and in texture, for example, cause differences in available water capacity that influence the occurrence of a species and the rate at which a tree grows. Other features, such as slope, stoniness, rockiness, or a clayey subsoil, determine the kind of woodland management. Aspect, or the direction in which a sloping soil faces, also affects tree growth and management potential.

The soils of the survey area are rated for woodland suitability in table 3. The columns in the table are explained in the following paragraphs.

The soils have been evaluated according to a nationwide system used by woodland conservationists and soil scientists of the Soil Conservation Service. In this system, mapping units are placed in woodland suitability *classes* according to their potential productivity for a tree species or group of tree species. They are put into *subclasses* according to selected soil properties or characteristics that can restrict woodland management operations.

The woodland suitability classes defining a range of site index indicate potential soil productivity. Within the Northeast Region, which includes the State of West Virginia, six woodland suitability classes are established.

Woodland suitability classes are designated by Arabic numerals 1 through 6. Class 1 is potentially the highest in productivity, followed consecutively by classes 2, 3, 4, and so on, to include the entire site-index range of each species or forest type. Classes 1 through 6 are all in the survey area.

The classes and their site index for specified trees are as follows:

TABLE 3.—*Woodland*

[The species listed under *Species suitability* are those most commonly preferred. They are not listed in order of preference. Red sidered suitable for managed Christmas-tree

Soil series and map symbols	Woodland suitability subclass	Aspect	Productivity		Hazards and limitations	
			Species	Site index	Erosion hazard	Equipment restrictions
Albrights: AbB, AbC.	3w		Upland oaks Yellow-poplar	65–75 75–85	Slight	Moderate
Allegheny: AfB, AgB, AgC.	3o		Upland oaks Yellow-poplar	65–75 75–85	Slight	Slight
Andover and Brinkerton: ArB.	2w		Upland oaks Black cherry	75–85 75–85	Slight	Severe
Atkins: At, Ay.	1w		Pin oak	85+	Slight	Severe
Berks:						
BcB, BcC, BcC3.	4f		Upland oaks Virginia pine White pine	55–65 55–65 65–75	Slight	Slight
BcD, BcD3, BcE, BcE3.	4f	North.	Upland oaks Virginia pine White pine	55–65 55–65 65–75	Slight	Moderate
	5f	South.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Slight	Moderate
BcF.	4f	North.	Upland oaks Virginia pine White pine	55–65 55–65 65–75	Moderate	Severe
	5f	South.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Moderate	Severe
BkB, BkC, BkC3.	5f		Upland oaks Virginia pine White pine	45–55 45–55 55–65	Slight	Slight
BkD, BkD3, BkE3.	5f	North.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Slight	Moderate
	6f	South.	Upland oaks Virginia pine White pine	35–45 35–45 45–55	Slight	Moderate
BkF.	5f	North.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Moderate	Severe

suitability of soils

pine is better suited to elevations of more than 2,000 feet. Species suitable for Christmas tree are included only for those soils conplantations. The symbol < means less than]

Hazards and limitations—Continued				Species suitability		
Seedling mortality	Plant competition		Windthrow hazard	To favor in existing stands	To favor in planting	For Christmas trees
	Conifers	Hardwoods				
Slight	Moderate	Slight	Slight	Red oak, white oak, black oak, yellow-poplar, white ash, black walnut.	White pine, Virginia pine, Norway spruce, yellow-poplar.	Scotch pine, white pine, Norway spruce.
Slight	Moderate	Slight	Slight	Red oak, white oak, black oak, yellow-poplar, Virginia pine, black walnut.	White pine, Virginia pine, Norway spruce, black walnut, yellow-poplar.	Scotch pine, white pine, Norway spruce, Douglas-fir.
Severe	Severe	Moderate	Moderate	Red oak, black cherry, white ash, red maple.	White pine, Japanese larch.	Not suitable.
Severe	Severe	Severe	Moderate	Pin oak, sycamore, red maple.	White pine	Not suitable.
Severe	Moderate	Slight	Slight	Red oak, chestnut oak, scarlet oak, Virginia pine, white pine.	White pine, Virginia pine.	Scotch pine, white pine, Douglas-fir
Severe	Moderate	Slight	Slight	Red oak, chestnut oak, scarlet oak, Virginia pine, white pine.	White pine, Virginia pine.	Scotch pine, white pine, Douglas-fir
Severe	Slight	Slight	Slight	Red oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	White pine, Virginia pine.	Scotch pine, white pine.
Severe	Moderate	Slight	Slight	Red oak, chestnut oak, scarlet oak, Virginia pine, white pine.	White pine, Virginia pine.	Not suitable.
Severe	Slight	Slight	Slight	Black oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	White pine, Virginia pine.	Not suitable.
Severe	Slight	Slight	Slight	Black oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	White pine, Scotch pine.
Severe	Slight	Slight	Slight	Black oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.
Severe	Slight	Slight	Slight	Chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.
Severe	Slight	Slight	Slight	Black oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.

TABLE 3.—*Woodland suitability*

Soil series and map symbols	Woodland suitability subclass	Aspect	Productivity		Hazards and limitations	
			Species	Site index	Erosion hazard	Equipment restrictions
	6f	South.	Upland oaks Virginia pine White pine	35–45 35–45 45–55	Moderate	Severe
Braddock: BrB, BrC.	3o		Upland oaks Yellow-poplar	65–75 75–85	Slight	Slight
Brinkerton: BsB.	2w		Upland oaks Yellow-poplar	75–85 85–95	Slight	Severe
Buchanan:						
BuB, BuC, BvC.	3o		Upland oaks Yellow-poplar White pine	65–75 75–85 75–85	Slight	Slight
BvD.	3o		Upland oaks Yellow-poplar White pine	65–75 75–85 75–85	Moderate	Moderate
Calvin:						
CaD.	2f	North.	Upland oaks Yellow-poplar	75–85 85–95	Moderate	Moderate
	3f	South.	Upland oaks Yellow-poplar	65–75 75–85	Moderate	Moderate
CbC.	4f		Upland oaks Virginia pine	55–65 55–65	Slight	Slight
CcF.	2x	North.	Upland oaks Yellow-poplar	75–85 85–95	Severe	Severe
	3x	South.	Upland oaks Yellow-poplar	65–75 75–85	Severe	Severe
Chagrin: Cg.	1o		Upland oaks Yellow-poplar	85+ 95+	Slight	Slight

of soils—Continued

Hazards and limitations—Continued				Species suitability		
Seedling mortality	Plant competition		Windthrow hazard	To favor in existing stands	To favor in planting	For Christmas trees
	Conifers	Hardwoods				
Severe	Slight	Slight	Slight	Chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.
Slight	Moderate	Slight	Slight	Red oak, black oak, white oak, yellow-poplar, white pine, Virginia pine, black walnut.	White pine, black walnut, yellow-poplar, Virginia pine.	Scotch pine, white pine, Norway spruce, Douglas-fir.
Severe	Severe	Moderate	Slight	Red oak, white oak, black cherry, red maple, yellow-poplar, white ash.	White pine, Norway spruce, Japanese larch, red pine.	Not suitable.
Slight	Moderate	Slight	Slight	Red oak, white oak, yellow-poplar, black walnut, sugar maple, white pine.	White pine, Virginia pine, Norway spruce, Japanese larch.	Scotch pine, white pine, Norway spruce, Douglas-fir.
Slight	Moderate	Slight	Slight	Red oak, white oak, yellow-poplar, black walnut, sugar maple, white pine.	White pine, Virginia pine, Norway spruce, Japanese larch.	Scotch pine, white pine, Norway spruce, Douglas-fir.
Slight	Severe	Moderate	Slight	Red oak, white oak, black oak, white ash, yellow-poplar, black walnut.	White pine, Virginia pine, Norway spruce, black walnut, black locust, red pine.	Scotch pine, white pine, Norway spruce, Fraser fir.
Slight	Moderate	Slight	Slight	Red oak, white oak, black oak, yellow-poplar, black walnut, white pine.	White pine, Virginia pine.	Scotch pine, white pine, Norway spruce, Fraser fir.
Severe	Moderate	Slight	Slight	Red oak, black oak, chestnut oak, scarlet oak, Virginia pine, white pine.	Virginia pine, white pine.	Scotch pine, white pine, Douglas-fir.
Moderate	Severe	Moderate	Slight	Red oak, white oak, black oak, white ash, yellow poplar, black walnut.	White pine, Virginia pine, Norway spruce.	Not suitable (stoniness, slopes).
Moderate	Moderate	Slight	Slight	Red oak, white oak, black oak, yellow-poplar, black walnut, white pine.	White pine, Virginia pine.	Not suitable (stoniness, slopes).
Slight	Severe	Moderate	Slight	Yellow-poplar, black walnut, red oak, white oak, white ash, black locust.	Yellow-poplar, black walnut, black locust, white pine.	Not suitable (flooding).

TABLE 3.—*Woodland suitability*

Soil series and map symbols	Woodland suitability subclass	Aspect	Productivity		Hazards and limitations	
			Species	Site index	Erosion hazard	Equipment restrictions
Clarksburg:						
CkB, CkC.	3w [1]		Upland oaks Yellow-poplar	65–75 75–85	Moderate	Moderate
ClC, ClD.	3w [1]		Upland oaks Yellow-poplar	65–75 75–85	Moderate	Moderate
Dekalb and Lehew:						
DlC.	4f [1]		Upland oaks Virginia pine White pine	55–65 55–65 65–75	Slight	Slight
DlE.	4f [1]	North.	Upland oaks Virginia pine White pine	55–65 55–65 65–75	Moderate	Moderate
	5f [1]	South.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Moderate	Moderate
DlF.	4f [1]	North.	Upland oaks Virginia pine White pine	55–65 55–65 65–75	Moderate	Severe
	5f [1]	South.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Moderate	Severe
Dunning: Du.	1w		Pin oak	85+	Slight	Severe
Edom:						
EaC, EbC3.	3c		Upland oaks Yellow-poplar	65–75 75–85	Moderate	Moderate
EaD, EaE, EbD3.	3c	North.	Upland oaks Yellow-poplar	65–75 75–85	Severe	Moderate
	4c	South.	Upland oaks Virginia pine	55–65 55–65	Severe	Moderate
EbF3.	3c	North.	Upland oaks Yellow-poplar	65–75 75–85	Severe	Severe

of soils—Continued

Hazards and limitations—Continued				Species suitability		
Seedling mortality	Plant competition		Windthrow hazard	To favor in existing stands	To favor in planting	For Christmas trees
	Conifers	Hardwoods				
Slight	Moderate	Moderate	Slight	Red oak, white oak, yellow-poplar, black walnut, white ash, black locust.	White pine, yellow-poplar, Norway spruce, Virginia pine, black locust.	Scotch pine, white pine, Norway spruce.
Slight	Moderate	Slight	Slight	Red oak, white oak, yellow-poplar, black walnut, white ash, black locust.	White pine, yellow-poplar, Norway spruce, Virginia pine.	Not suitable (stoniness).
Severe	Moderate	Slight	Slight	Red oak, black oak, chestnut oak, scarlet oak, Virginia pine, white pine.	Virginia pine, white pine.	Scotch pine, white pine, Douglas-fir.
Severe	Moderate	Slight	Slight	Red oak, black oak, chestnut oak, Virginia pine, white pine.	Virginia pine, white pine.	Scotch pine, white pine, Douglas-fir.
Severe	Slight	Slight	Slight	Chestnut oak, scarlet oak, Virginia pine, pitch pine, white pine.	Virginia pine, white pine.	Not suitable.
Severe	Moderate	Slight	Slight	Red oak, black oak, chestnut oak, Virginia pine, white pine.	Virginia pine, white pine.	Not suitable.
Severe	Slight	Slight	Slight	Chestnut oak, scarlet oak, Virginia pine, white pine.	Virginia pine, white pine.	Not suitable.
Severe	Severe	Severe	Slight	Pin oak, red maple, sycamore.	White pine	Not suitable.
Moderate	Severe	Moderate	Slight	Red oak, black oak, white pine, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine, black walnut, yellow-poplar.	Scotch pine, white pine.
Moderate	Severe	Moderate	Slight	Red oak, black oak, white pine, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine, black walnut, yellow-poplar.	Scotch pine, white pine.
Severe	Moderate	Moderate	Slight	Red oak, black oak, white pine, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine.	Scotch pine, white pine.
Moderate	Severe	Moderate	Slight	Red oak, black oak, white pine, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine, yellow-poplar, black walnut.	Scotch pine, white pine.

TABLE 3.—*Woodland suitability*

Soil series and map symbols	Woodland suitability subclass	Aspect	Productivity		Hazards and limitations	
			Species	Site index	Erosion hazard	Equipment restrictions
	4c	South.	Upland oaks Virginia pine	55–65 55–65	Severe	Severe
Edom variant: EcC, EdC3.	4c		Upland oaks Virginia pine	55–65 55–65	Moderate	Moderate
EcD, EcE, EdD3.	4c	North.	Upland oaks Virginia pine	55–65 55–65	Severe	Moderate
	5c	South.	Upland oaks Virginia pine	45–55 45–55	Severe	Moderate
Elliber: ElC.	3f		Upland oaks Yellow-poplar	65–75 75–85	Slight	Slight
ElD, ElE, EmE.	2f	North.	Upland oaks Yellow-poplar	75–85 85–95	Slight	Moderate
	3f	South.	Upland oaks Yellow-poplar	65–75 75–85	Slight	Moderate
EmF.	2f	North.	Upland oaks Yellow-poplar	75–85 85–95	Moderate	Severe
	3f	South.	Upland oaks Yellow-poplar	65–75 75–85	Moderate	Severe
Ernest: ErB.	3w [1]		Upland oaks Yellow-poplar	65–75 75–85	Slight	Moderate
ErC.	3w [1]		Upland oaks Yellow-poplar	65–75 75–85	Moderate	Moderate

of soils—Continued

Hazards and limitations—Continued				Species suitability		
Seedling mortality	Plant competition		Windthrow hazard	To favor in existing stands	To favor in planting	For Christmas trees
	Conifers	Hardwoods				
Severe	Moderate	Moderate	Slight	Red oak, black oak, white pine, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine.	Scotch pine, white pine.
Severe	Moderate	Moderate	Slight	Red oak, black oak, white pine, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine.	Scotch pine, white pine.
Severe	Moderate	Moderate	Slight	Red oak, black oak, white pine, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine.	Scotch pine, white pine.
Severe	Moderate	Slight	Slight	Chestnut oak, black oak, scarlet oak, Virginia pine, white pine.	Virginia pine, white pine.	Not suitable.
Slight	Moderate	Slight	Slight	Red oak, white oak, white ash, yellow-poplar, black walnut, sugar maple.	White pine, Virginia pine, Norway spruce, black walnut.	Scotch pine, white pine, Norway spruce, Douglas-fir.
Slight	Severe	Moderate	Slight	Red oak, white oak, white ash, yellow-poplar, black walnut, sugar maple.	White pine, Virginia pine, yellow-poplar, Norway spruce, black walnut.	Scotch pine, white pine, Norway spruce, Douglas-fir.
Moderate	Moderate	Slight	Slight	Red oak, white oak, white ash, black walnut, sugar maple, yellow-poplar.	White pine, Virginia pine, Norway spruce, black walnut.	Scotch pine, white pine, Norway spruce, Douglas-fir.
Slight	Severe	Moderate	Slight	Red oak, white oak, white ash, yellow-poplar, black walnut, sugar maple.	White pine, Virginia pine, yellow-poplar, Norway spruce.	Not suitable.
Moderate	Moderate	Slight	Slight	Red oak, white oak, white ash, yellow-poplar, black walnut, sugar maple.	White pine, Virginia pine, Norway spruce.	Not suitable.
Slight	Moderate	Slight	Slight	Red oak, white oak, white pine, yellow-poplar, white ash, sugar maple, black walnut.	White pine, Norway spruce, yellow-poplar, red pine.	Scotch pine, white pine, Norway spruce.
Slight	Moderate	Slight	Slight	Red oak, white oak, black oak, white pine, yellow-poplar, white ash, sugar maple, black walnut.	White pine, Norway spruce, yellow-poplar, red pine.	Scotch pine, white pine, Norway spruce.

TABLE 3.—*Woodland suitability*

Soil series and map symbols	Woodland suitability subclass	Aspect	Productivity		Hazards and limitations	
			Species	Site index	Erosion hazard	Equipment restrictions
Es.	2w		Upland oaks Yellow-poplar White pine	75–85 85–95 85–95	Moderate	Moderate
Fluvaquents: FA.	2w		Upland oaks Yellow-poplar	75–85 85–95	Slight	Severe
Gilpin:						
GIB, GIC.	2o [2]		Upland oaks Yellow-poplar Black cherry	75–85 85–95 75–85	Slight	Slight
GID, GIE.	2r [2]	North.	Upland oaks Yellow-poplar Black cherry	75–85 85–95 75–85	Moderate	Moderate
	3r [2]	South.	Upland oaks Yellow-poplar Black cherry	65–75 75–85 65–75	Moderate	Moderate
GmC.	2x [2]		Upland oaks Yellow-poplar Black cherry	75–85 85–95 75–85	Slight	Moderate
GmF.	2x [2]	North.	Upland oaks Yellow-poplar Black cherry	75–85 85–95 75–85	Moderate	Severe
	3x [2]	South.	Upland oaks Black cherry	65–75 65–75	Moderate	Severe
Huntington: Hu.	1o		Upland oaks Yellow-poplar	85+ 95+	Slight	Slight
Laidig:						
LaB, LaC, LbC.	3o		Upland oaks Yellow-poplar Virginia pine	65–75 75–85 65–75	Slight	Slight

of soils—Continued

Hazards and limitations—Continued				Species suitability		
Seedling mortality	Plant competition		Windthrow hazard	To favor in existing stands	To favor in planting	For Christmas trees
	Conifers	Hardwoods				
Slight	Moderate	Slight	Slight	Red oak, white oak, black oak, white pine, yellow-poplar, white ash, sugar maple, black walnut.	White pine, yellow-poplar, Norway spruce.	Not suitable.
Severe	Severe	Severe	Slight	Red oak, white oak, red maple, sycamore, pin oak.	White pine, yellow-poplar, Norway spruce.	Not suitable.
Slight	Severe	Moderate	Slight	Red oak, white oak, black oak, black walnut, yellow-poplar, black cherry, sugar maple, white ash.	White pine, yellow-poplar, black walnut, Norway spruce, Virginia pine.	Scotch pine, white pine, Norway spruce, Fraser fir.
Slight	Severe	Moderate	Slight	Red oak, white oak, black oak, black walnut, yellow-poplar, black cherry, sugar maple, white ash.	White pine, yellow-poplar, black walnut, Norway spruce, Virginia pine.	Scotch pine, white pine, Norway spruce, Fraser fir.
Moderate	Moderate	Slight	Slight	Red oak, white oak, black oak, black walnut, yellow-poplar, black cherry, sugar maple, white ash.	White pine, Virginia pine, Norway spruce, red pine.	Scotch pine, white pine, Norway spruce, Fraser fir.
Moderate	Severe	Moderate	Slight	Red oak, white oak, black oak, black walnut, yellow-poplar, black cherry, sugar maple.	White pine, Norway spruce, red pine.	Not suitable.
Moderate	Severe	Moderate	Slight	Red oak, white oak, black oak, black walnut, yellow-poplar, black cherry, sugar maple.	White pine, Norway spruce, red pine.	Not suitable.
Severe	Moderate	Slight	Slight	Red oak, white oak, black oak, black cherry, sugar maple, white ash, black walnut.	White pine, Norway spruce, Virginia pine, red pine.	Not suitable.
Slight	Severe	Severe	Slight	Yellow-poplar, black oak, red oak, white oak, white ash, black walnut.	Yellow-poplar, black walnut, white pine, black locust.	Not suitable.
Slight	Moderate	Slight	Slight	Red oak, white oak, yellow-poplar, black walnut, white ash, sugar maple.	White pine, yellow-poplar, black walnut, Virginia pine, Norway spruce.	Scotch pine, white pine, Norway spruce (LbC not suitable).

TABLE 3.—*Woodland suitability*

Soil series and map symbols	Woodland suitability subclass	Aspect	Productivity		Hazards and limitations	
			Species	Site index	Erosion hazard	Equipment restrictions
LaD, LbD.	3r		Upland oaks Yellow-poplar Virginia pine	65–75 75–85 65–75	Moderate	Moderate
LcE.	3x		Upland oaks Yellow-poplar Virginia pine	65–75 75–85 65–75	Moderate	Severe
Lehew:						
LeB, LeB3, LeC, LeC3, LkB, LkB3, LkC, LkC3, LlC.	4f		Upland oaks Virginia pine White pine	55–65 55–65 65–75	Slight	Slight
LeD, LeD3, LeE, LkD, LkD3, LkE, LlD, LlE.	4f	North.	Upland oaks Virginia pine White pine	55–65 55–65 65–75	Slight	Moderate
	5f	South.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Slight	Moderate
LeF, LkF, LlF.	4f	North.	Upland oaks Virginia pine White pine	55–65 55–65 65–75	Moderate	Severe
	5f	South.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Moderate	Severe
Lindside: Ln.	1w		Upland oaks Yellow-poplar	85+ 95+	Slight	Moderate
Lithic Udorthents-Rock outcrop complex: LR.	6d		Upland oaks	<45	Moderate to severe.	Severe
Melvin: Me.	1w		Pin oak	85+	Slight	Severe
Monongahela:						
MhA, MhB.	4w		Upland oaks Virginia pine	55–65 55–65	Slight	Moderate
MhC, MhC3.	4w		Upland oaks Virginia pine	55–65 55–65	Moderate	Moderate

of soils—Continued

Hazards and limitations—Continued				Species suitability		
Seedling mortality	Plant competition		Windthrow hazard	To favor in existing stands	To favor in planting	For Christmas trees
	Conifers	Hardwoods				
Slight	Moderate	Slight	Slight	Red oak, white oak, yellow-poplar, black walnut, white ash, sugar maple.	White pine, yellow-poplar, black walnut, Virginia pine, Norway spruce.	Scotch pine, white pine, Norway spruce (LbD not suitable).
Slight	Moderate	Slight	Slight	Red oak, white oak, yellow-poplar, black walnut, white ash, sugar maple.	White pine, yellow-poplar, black walnut, Virginia pine, Norway spruce.	Not suitable.
Severe	Moderate	Slight	Slight	Chestnut oak, scarlet oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Scotch pine, white pine.
Severe	Moderate	Slight	Slight	Chestnut oak, scarlet oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Scotch pine, white pine.
Severe	Slight	Slight	Slight	Chestnut oak, scarlet oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Not suitable.
Severe	Moderate	Slight	Slight	Chestnut oak, scarlet oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Not suitable.
Severe	Slight	Slight	Slight	Chestnut oak, scarlet oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Not suitable.
Slight	Severe	Severe	Slight	Red oak, yellow-poplar, black walnut, white ash.	White pine, yellow-poplar, Norway spruce.	Not suitable.
Severe	Slight	Slight	Moderate to severe.	Any species	Not generally plantable.	Not suitable.
Severe	Severe	Severe	Slight	Pin oak, red maple, sycamore.	White pine, Norway spruce.	Not suitable.
Slight	Moderate	Slight	Slight	Red oak, black oak, scarlet oak, white pine, Virginia pine, yellow-poplar.	White pine, Virginia pine.	Scotch pine, white pine.
Slight	Moderate	Slight	Slight	Red oak, black oak, scarlet oak, white pine, Virginia pine, yellow-poplar.	White pine, Virginia pine.	Scotch pine, white pine.

TABLE 3.—*Woodland suitability*

Soil series and map symbols	Woodland suitability subclass	Aspect	Productivity		Hazards and limitations	
			Species	Site index	Erosion hazard	Equipment restrictions
Murrill: MlB, MlC, MsC, MvB, MvC.	3o		Upland oaks Yellow-poplar	65–75 75–85	Slight	Slight
MlD, MsD, MsE, MvD.	3r		Upland oaks Yellow-poplar	65–75 75–85	Moderate	Moderate
Opequon-Rock outcrop complex: OpD, OpD3.	3x		Upland oaks	65–75	Moderate	Moderate
OpF.	3x	North.	Upland oaks	65–75	Severe	Severe
	4x	South.	Upland oaks	55–65	Severe	Severe
Philo: Pf, Pg, Ph.	1w		Upland oaks Yellow-poplar	85+ 95+	Slight	Moderate
Pope: Pm, Po, Ps.	2o		Upland oaks Yellow-poplar	75–85 85–95	Slight	Slight
Purdy: Pu.	1w		Pin oak	85+	Slight	Severe
Ramsey-Dekalb: RdD.	6x [1]		Upland oaks Virginia pine	55–65 55–65	Slight	Moderate
RdF.	5x [1]	North.	Upland oaks Virginia pine	55–65 55–65	Moderate	Severe
	6x [1]	South.	Upland oaks Virginia pine	45–55 45–55	Moderate	Severe
Rubble land: Rn Too variable to be rated.						

of soils—Continued

Hazards and limitations—Continued				Species suitability		
Seedling mortality	Plant competition		Windthrow hazard	To favor in existing stands	To favor in planting	For Christmas trees
	Conifers	Hardwoods				
Slight	Moderate	Slight	Slight	Red oak, black oak, white oak, yellow-poplar, white ash, black walnut, black locust.	White pine, yellow-poplar, black walnut, Norway spruce.	Scotch pine, white pine, Norway spruce (MsC not suitable).
Slight	Moderate	Slight	Slight	Red oak, black oak, white oak, yellow-poplar, white ash, black walnut, black locust.	White pine, yellow-poplar, black walnut, Norway spruce.	Scotch pine, white pine, Norway spruce (MsD, MsE not suitable).
Moderate	Severe	Moderate	Slight	Red oak, black oak, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine, Japanese larch.	Not suitable.
Moderate	Severe	Moderate	Slight	Red oak, black oak, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine, Japanese larch.	Not suitable.
Severe	Moderate	Moderate	Slight	Red oak, black oak, Virginia pine, black walnut, yellow-poplar.	White pine, Virginia pine, Japanese larch.	Not suitable.
Slight	Severe	Severe	Slight	Yellow-poplar, red oak, white ash, white oak, black walnut.	White-pine, yellow-poplar, Norway spruce.	Not suitable.
Slight	Severe	Moderate	Slight	Red oak, yellow-poplar, white ash, white pine, black walnut.	White pine, yellow-poplar, black walnut.	Not suitable.
Severe	Severe	Severe	Slight	Pin oak, sycamore, red maple.	White pine, Norway spruce.	Not suitable.
Severe	Slight	Slight	Moderate	Chestnut oak, scarlet oak, black oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.
Severe	Slight	Slight	Slight	Chestnut oak, scarlet oak, black oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.
Severe	Slight	Slight	Slight	Chestnut oak, scarlet oak, black oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.

TABLE 3.—*Woodland suitability*

Soil series and map symbols	Woodland suitability subclass	subclass	Productivity		Hazards and limitations	
			Species	Site index	Erosion hazard	Equipment restrictions
Rushtown:						
RuD.	4f		Upland oaks Virginia pine	55–65 55–65	Slight	Slight
RuF.	4f		Upland oaks Virginia pine	55–65 55–65	Moderate	Severe
Schaffenaker.						
ShC.	4s		Upland oaks Virginia pine White pine	55–65 55–65 65–75	Slight	Moderate
ShE.	4s	North.	Upland oaks Virginia pine White pine	55–65 55–65 65–75	Slight	Moderate
	5s	South.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Slight	Moderate
ShF.	4s	North.	Upland oaks Virginia pine White pine	55–65 55–65 65–75	Moderate	Severe
	5s	South.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Moderate	Severe
Strip mine: SM. Too variable to be rated.						
Tygart: Tg.	2w		Upland oaks Yellow-poplar	75–85 85–95	Slight	Severe
Typic Dystrochrepts: TPC, TPE.	5x		Upland oaks Virginia pine	45–55 45–55	Slight	Severe
Udifluvents and Fluvaquents: UF. Too variable to be rated.						
Weikert:						
WeB3, WeC3.	6d		Upland oaks Virginia pine White pine	35–45 35–45 45–55	Slight	Slight
WeD3, WeE3.	5d	North.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Moderate	Moderate
	6d	South.	Upland oaks Virginia pine White pine	35–45 35–45 45–55	Moderate	Moderate

of soils—Continued

Hazards and limitations—Continued				Species suitability		
Seedling mortality	Plant competition		Windthrow hazard	To favor in existing stands	To favor in planting	For Christmas trees
	Conifers	Hardwoods				
Moderate	Moderate	Slight	Slight	Red oak, black oak, chestnut oak, white pine, Virginia pine.	White pine, Virginia pine.	Scotch pine, white pine.
Moderate	Moderate	Slight	Slight	Red oak, black oak, chestnut oak, white pine, Virginia pine.	White pine, Virginia pine.	Not suitable.
Moderate	Moderate	Slight	Slight	Black oak, chestnut oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Not suitable.
Moderate	Moderate	Slight	Slight	Black oak, chestnut oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Not suitable.
Severe	Slight	Slight	Slight	Black oak, chestnut oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Not suitable.
Moderate	Moderate	Slight	Slight	Black oak, chestnut oak, scarlet oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Not suitable.
Severe	Slight	Slight	Slight	Black oak, chestnut oak, scarlet oak, white pine, Virginia pine, pitch pine.	White pine, Virginia pine.	Not suitable.
Moderate to severe.	Severe	Severe	Slight	Red oak, black oak, white oak, yellow-poplar, white ash, red maple.	White pine, Virginia pine, Norway spruce, yellow-poplar.	Scotch pine, white pine.
Severe	Slight	Slight	Slight	Any species	Not generally plantable.	Not suitable.
Severe	Slight	Slight	Slight	Virginia pine, white pine, chestnut oak, scarlet oak, pitch pine.	Virginia pine, white pine, pitch pine.	Scotch pine, white pine.
Severe	Slight	Slight	Slight	Virginia pine, white pine, chestnut oak, scarlet oak, pitch pine.	Virginia pine, white pine, pitch pine.	Scotch pine, white pine.
Severe	Slight	Slight	Slight	Virginia pine, white pine, chestnut oak, scarlet oak, pitch pine.	Virginia pine, white pine, pitch pine.	Not suitable.

TABLE 3.—*Woodland suitability*

Soil series and map symbols	Woodland suitability subclass	Aspect	Productivity		Hazards and limitations	
			Species	Site index	Erosion hazard	Equipment restrictions
WeF3.	5d	North.	Upland oaks Virginia pine White pine	45–55 45–55 55–65	Moderate	Severe
	6d	South.	Upland oaks Virginia pine White pine	35–45 35–45 45–55	Moderate	Severe
WkB, WkC.	4d		Upland oaks Virginia pine White pine	50–60 50–60 60–70	Slight	Slight
WkD, WkE.	4d	North.	Upland oaks Virginia pine White pine	50–60 50–60 60–70	Slight	Moderate
	5d	South.	Upland oaks Virginia pine White pine	40–50 40–50 50–60	Slight	Moderate
WkF.	4d	North.	Upland oaks Virginia pine White pine	50–60 50–60 60–70	Moderate	Severe
	5d	South.	Upland oaks Virginia pine White pine	40–50 40–50 50–60	Moderate	Severe
Wharton:						
WnB, WnC.	2w		Upland oaks Yellow-poplar	75–85 85–95	Moderate	Moderate
WoC.	2w		Upland oaks Yellow-poplar	75–85 85–95	Moderate	Moderate

[1] Rating is for soils in areas in valleys that have low rainfall. Where these soils occur in plateau areas that have higher precipitation, the woodland suitability subclass is one class higher; i.e., 3w becomes 2w.

Class 1, 85 or more for upland oaks; 95 or more for yellow-poplar.

Class 2, 75 to 85 for upland oaks; 85 to 95 for yellow-poplar.

Class 3, 65 to 75 for upland oaks; 75 to 85 for yellow-poplar.

Class 4, 55 to 65 for upland oaks; 55 to 65 for Virginia pine.

Class 5, 45 to 55 for upland oaks.

Class 6, 35 to 45 for upland oaks.

The subclasses are designated by adding a small letter, *x*, *w*, *t*, *d*, *c*, *s*, *f*, *r*, or *o*, to the class numeral, for example, 3x. The letter *x* indicates that the soils have restrictions or limitations because of stoniness or rockiness; *w* indicates excessive wetness; *t* indicates toxic substances; *d* indicates restricted rooting depth; *c* indicates restrictions or limitations because of clay in the upper part of the soil profile; *s* indicates dry, sandy soils; *f* indicates limitations that result from large amounts of coarse fragments in the soil profile; *r* indicates limitations of steepness of slope only; and *o* indicates soils that have no significant restrictions or

of soils—Continued

Hazards and limitations—Continued				Species suitability		
Seedling mortality	Plant competition		Windthrow hazard	To favor in existing stands	To favor in planting	For Christmas trees
	Conifers	Hardwoods				
Severe	Slight	Slight	Slight	Virginia pine, white pine, chestnut oak, scarlet oak, pitch pine.	Virginia pine, white pine, pitch pine.	Not suitable.
Severe	Slight	Slight	Slight	Virginia pine, white pine, chestnut oak, scarlet oak, pitch pine.	Virginia pine, white pine, pitch pine.	Not suitable.
Severe	Moderate	Slight	Slight	Black oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Scotch pine, white pine.
Severe	Moderate	Slight	Slight	Black oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Scotch pine, white pine.
Severe	Slight	Slight	Slight	Black oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.
Severe	Moderate	Slight	Slight	Black oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.
Severe	Slight	Slight	Slight	Black oak, chestnut oak, scarlet oak, Virginia pine, white pine, pitch pine.	Virginia pine, white pine.	Not suitable.
Moderate	Severe	Moderate	Slight	Red oak, white oak, black oak, yellow-poplar, white ash, black walnut.	White pine, yellow-poplar, Norway spruce.	Scotch pine, white pine, Norway spruce.
Moderate	Severe	Moderate	Slight	Red oak, white oak, black oak, yellow-poplar, white ash, black walnut.	White pine, yellow-poplar, Norway spruce.	Not suitable.

[1] Rating is for soils on plateaus that have higher rainfall. Where these soils occur in valley areas that have low rainfall, woodland suitability subclass is one class lower; i.e., 2o becomes 3o.

limitations for woodland use and management. Some kinds of soil may have more than one subclass characteristic. Priority in placing each kind of soil into a subclass is in the order that the subclass characteristics are listed in the first sentence of this paragraph. None of the soils in the area have been assigned to subclass *t*.

The aspects of some sloping soils, generally those that have slopes steeper than 20 percent, are shown in table 3. *North* aspects are those that face in any compass direction from north 45° west to south 45° east. *South* aspects are those that face in any compass direction from south 45° east to north 45° west. Aspects for any area of sloping soil can be determined from the photographic background of the soil map, from a stereo pair of plain aerial photos, from a topographic map of the area, or from compass readings taken on site. Aspect affects potential productivity of these soils. Aspect also affects the occurrence of a tree species and some management concerns.

Site index is shown as a range for the species found on a given soil and for which yield information is available. Productivity of soils for forest trees is meas-

ured by site index. The site index is the average height, in feet, of the dominant and codominant trees of a species or group of species in a well-stocked stand at 50 years of age. For example, if the site index for upland oaks is 70 on a given soil, this means that the dominant and codominant trees in a stand of oaks on that soil have an average height of 70 feet when the trees are 50 years old.

Erosion hazard refers to the soil erosion that may occur following cutting operations and where the soil is exposed along roads, skid trails, fire lanes, and log-decking areas. Slope and texture of the soil are the main features considered for this rating. The erosion hazard is *slight* if potential erosion is unimportant. It is *moderate* if some attention, such as diversion of water, is needed to prevent accelerated erosion. It is *severe* if intensive treatment is needed to control soil losses. Intensive treatment is the special care that must be taken in locating and building roads and skid trails, in diverting water during and after logging, and, in some places, in seeding grasses.

Equipment restrictions refer to trafficability of the soil. The ratings given indicate the degree to which the soil and its topographic features restrict the use of equipment commonly used in tree harvesting or cultural work. Soil wetness, size and amount of stones, clayey subsoil, and slope are the main causes of equipment restrictions. The restriction is *slight* if there is little or no limitation on the kind of equipment or the time of year equipment is used. Slopes are generally less than 20 percent. The restriction is *moderate* if the use of equipment is limited for less than 3 months a year by soil wetness and if slopes generally range from 20 to 40 percent. It is *severe* if the use of equipment is limited for more than 3 months a year by soil wetness, if there are large and numerous stones, or if slopes exceed 40 percent.

Seedling mortality refers to the expected degree of failure for natural seedlings or planting stock as influenced by kind of soil, degree of erosion, or other site factors, but not by plant competition. Excessive wetness or droughtiness are the main factors considered in this rating. A rating of *slight* means that expected mortality is less than 25 percent; *moderate* means that expected mortality is between 25 and 50 percent; and *severe* means that expected mortality is more than 50 percent.

Plant competition is the invasion or growth of undesirable plants when openings are made in the canopy. In this survey area, plant competition is generally more severe for pines than for hardwoods. A rating of *slight* means that competition does not prevent adequate natural regeneration of desirable species; *moderate* means that competition delays but does not prevent natural or artificial regeneration; and *severe* means that competition prevents such regeneration unless there are intensive site preparation and maintenance, such as weeding. Plant competition normally increases with increasing productivity and wetness of soils.

Windthrow hazard is evaluated by considering soil characteristics that control development of tree roots and therefore affect how firmly trees stand against winds. Depth to bedrock or other root-restricting layers is considered for this hazard. A rating of *slight* means that there are no special problems. A rating of *moderate* means that root development is adequate for stability, except during periods of excessive soil wetness or periods of strong wind velocity; *severe* means that the depth to which tree roots extend does not give adequate stability and that individual trees are easily blown over during periods of higher than average wind velocity.

Species suitability refers to commercially important species (1) to favor in existing stands; (2) to favor in planting; and (3) suitable for Christmas trees. The species are not listed in order of priority.

In table 4 the site index ratings in table 3 are translated into potential yields of board feet and cords of wood.

Wildlife [3]

Hampshire, Mineral, and Morgan Counties support good populations of native wildlife, largely because of favorable land use. Large tracts of woodland occur, mainly uneven-aged stands of hickory-oak-maple (northern hardwoods) complexes. These woodlands contain the elements of wildlife habitat that maintain high populations of white-tailed deer, turkey, ruffed grouse, and squirrels. The transitional area between woodland and farmland supports medium to high numbers of quail, rabbit, and groundhog. Flood-plain soils and the streams nearby support huntable populations of mourning dove, woodcock, and puddle ducks, in season. The main duck species are mallard, black duck, and wood duck.

Unusual conditions that affect wildlife populations in these counties are the slow growth of hardwood tree species on the dry shaly soils on ridges and the high hunting pressures generated by an annual influx of hunters from the Washington-Baltimore metropolitan area. The very slow growth of hardwood species on shale ridges causes trees to remain within browsing reach of white-tailed deer for as long as 20 years. In effect, forests of this type support deer and grouse longer and in greater numbers than those in other areas where natural soil fertility is greater. Coupled with the high populations of wildlife species is the heavy hunting pressure generated by out-of-state hunters. The combined effect is to make wildlife an important base resource in the survey area.

The development of an area for a wildlife species depends largely on the amount and distribution of food, shelter, and water. If any of these elements is missing, inadequate, or inaccessible, the species is absent or scarce. The kinds of wildlife that live in a given area and the number of each kind are closely related to land use, to the resulting kinds and patterns of vegetation, and to the supply and distribution of water. The kind of land management, in turn, is generally determined by the kinds of soil.

Habitat for wildlife generally can be created or improved by planting suitable vegetation, by properly managing the existing plant cover, by fostering the

[3] Prepared by ROBERT G. MORRIS, field biologist-recreation specialist, with the assistance of THOMAS C. CREBBS, biologist, Soil Conservation Service.

TABLE 4.—*Yields per acre of specified trees in even-aged, fully stocked natural stands* [1]

[Dashes indicate that the information does not apply or is not available]

Site index	Age of stand	Merchantable volume				
		Upland oaks		Yellow-poplar		Virginia pine
	Years	*Bd ft* [2]	*Cords* [3]	*Bd ft* [4]	*Cords* [5]	*Cords* [6]
50	30	350	6.4	--------	------	[7] 11.0
	40	1,400	12.8	--------	------	[7] 15.6
	50	3,250	18.8	--------	------	[7] 17.8
	70	8,150	29.5	--------	------	------
60	30	850	10.4	1,000	9.6	19.2
	40	3,200	18.6	2,650	15.5	26.9
	50	6,300	32.9	5,600	21.3	31.4
	70	12,800	38.7	--------	------	------
70	30	1,750	14.9	2,650	15.1	33.1
	40	5,500	24.6	6,780	23.2	46.3
	50	9,750	33.3	11,400	31.3	54.0
	70	17,700	47.4	--------	------	--
80	30	3,350	19.9	5,500	20.8	56.7
	40	8,600	30.7	11,230	31.2	76.9
	50	18,600	40.6	17,620	41.3	92.9
	70	23,100	56.1	--------	------	------
90	30	--------	------	8,710	26.6	------
	40	--------	------	16,300	39.0	------
	50	--------	------	24,400	51.9	------
	70	--------	------	--------	------	------
100	30	--------	------	17,150	32.4	------
	40	--------	------	21,790	47.3	------
	50	--------	--	32,150	61.7	------
	70	--------	------	--------	------	------

[1] Compiled from USDA Technical Bulletins 560 (*8*) and 356 (*6*) and Southeast Forest Experiment Station Paper 124 (*12*).
[2] According to International rule, ⅛ inch, for stems to a top diameter of 5 inches inside bark.
[3] Unpeeled volume in standard cords of merchantable stems to top diameter of 4 inches outside bark.
[4] According to International rule, ⅛ inch, for stems to a top diameter of 6 inches inside bark.
[5] Peeled volume in standard cords of all trees 5 inches or more in diameter breast high and to a top diameter of 6 inches inside bark.
[6] Unpeeled volume in standard cords of all stems 4 inches or more in diameter breast high and to a top diameter of 4 inches outside bark. Computed from cubic-foot values for 100 percent density stands using a converting factor of 85 cubic feet per standard cord.
[7] Extrapolated from values for site indexes 55 through 80.

natural establishment of desirable plants, or by using a combination of these measures.

In table 5 the soils of Hampshire, Mineral, and Morgan Counties are rated according to their suitability for seven elements of wildlife habitat and for three general kinds of wildlife (*1*).

A rating of *good* means habitat is generally easily created, improved, or maintained. There are few or no soil limitations in habitat management, and satisfactory results are well assured. A rating of *fair* means habitat usually can be created, improved, or maintained, but the soils have moderate limitations that affect the creation, improvement, or maintenance of the habitat. A moderate intensity of management and fairly frequent attention may be required to assure satisfactory results. A rating of *poor* means habitat can usually be created, improved, or maintained, but there are rather severe soil limitations. Habitat management may be difficult and expensive and require intensive effort. Satisfactory results are questionable. A rating of *very poor* means it is impractical to create, improve, or maintain habitat because of the very severe soil limitations. Unsatisfactory results are probable. Not considered in the ratings are present land use, the location of a soil in relation to other soils, and the mobility of wildlife.

These suitability ratings can be used as an aid in:

1. Planning the broad use of parks, refuges, nature-study areas, and other recreational developments for wildlife.
2. Selecting the better soils for creating, improving, or maintaining specific kinds of wildlife habitat elements.
3. Determining the relative intensity of management needed for individual habitat elements.
4. Eliminating sites that would be difficult or impractical to manage for specific kinds of wildlife.
5. Determining areas that are suitable for acquisition for use by wildlife.

TABLE 5.—*Suitability of the soils for elements*

Soil series and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees
Albrights: AbB, AbC	Fair	Good	Good	Good
Allegheny: AfB, AgB, AgC	Fair	Good	Good	Good
Andover: ArB	Very poor	Poor	Fair	Fair
For Brinkerton part, see Brinkerton series.				
Atkins: At, Ay	Poor	Fair	Fair	Good
Berks:				
BcB, BcC	Fair	Fair	Fair	Fair
BcC3, BcD	Poor	Fair	Fair	Fair
BcD3, BcE	Very poor	Poor	Fair	Fair
BcE3, BcF	Very poor	Very poor	Fair	Fair
BkB, BkC	Poor	Poor	Fair	Fair
BkC3, BkD	Very poor	Poor	Fair	Fair
BkD3	Very poor	Poor	Fair	Fair
BkE3, BkF	Very poor	Very poor	Fair	Fair
Braddock: BrB, BrC	Fair	Good	Good	Good
Brinkerton: BsB	Poor	Poor	Fair	Fair
Buchanan:				
BuB, BuC	Fair	Good	Good	Good
BvC, BvD	Very poor	Poor	Good	Good
Calvin:				
CaD, CbC	Poor	Fair	Fair	Fair
CcF	Very poor	Poor	Fair	Fair
Chagrin: Cg	Fair	Good	Good	Good
Clarksburg:				
CkB, CkC	Fair	Good	Good	Good
ClC, ClD	Very poor	Poor	Good	Good
Dekalb:				
DlC, DlE	Very poor	Poor	Fair	Fair
DlF	Very poor	Very poor	Fair	Fair
For Lehew parts of DlC, DlE, and DlF, see Lehew series.				
Dunning: Du	Very poor	Poor	Poor	Good
Edom:				
EaC, EbC3	Fair	Good	Good	Good
EaD	Poor	Fair	Good	Good
EaE	Very poor	Poor	Good	Good
EbD3	Very poor	Poor	Good	Good
EbF3	Very poor	Very poor	Good	Good
Edom variant:				
EcC, EdC3, EcD, EdD3	Poor	Poor	Fair	Fair
EcE	Very poor	Poor	Fair	Fair
Elliber:				
ElC	Fair	Fair	Fair	Fair
ElD	Poor	Fair	Fair	Fair
ElE	Very poor	Poor	Fair	Fair
EmE, EmF	Very poor	Very poor	Poor	Poor
Ernest:				
ErB, ErC	Fair	Good	Good	Good
Es	Very poor	Poor	Good	Good
Fluvaquents: FA	Poor	Fair	Fair	Good
Gilpin:				
GlB, GlC	Fair	Good	Good	Good
GlD	Poor	Fair	Good	Good
GlE, GmC, GmF	Very poor	Poor	Good	Good
Huntington: Hu	Fair	Good	Good	Good
Laidig:				
LaB, LaC	Fair	Good	Good	Good
LaD	Poor	Fair	Good	Good
LbC, LbD	Very poor	Poor	Good	Good
LcE	Very poor	Very poor	Poor	Poor
Lehew:				
LeB, LeB3, LeC	Fair	Fair	Fair	Fair
LeC3, LeD	Poor	Fair	Fair	Fair
LeD3, LeE	Very poor	Poor	Fair	Fair
LeF	Very poor	Very poor	Fair	Fair
LkB, LkB3, LkC	Fair	Fair	Fair	Fair
LkC3, LkD	Poor	Fair	Fair	Fair
LkD3, LkE	Very poor	Poor	Fair	Fair
LkF	Very poor	Very poor	Fair	Fair
LlC	Fair	Fair	Fair	Fair
LlD	Poor	Fair	Fair	Fair
LlE	Very poor	Poor	Fair	Fair

of wildlife habitat and kinds of wildlife

Elements of wildlife habitat—Continued			Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow-water areas	Openland	Woodland	Wetland
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Fair	Poor	Very poor	Poor	Fair	Very poor.
Fair	Fair	Poor	Fair	Good	Poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Fair	Poor	Very poor	Poor	Fair	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Good	Good	Good	Poor	Good	Good.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Good	Very poor	Very poor	Very poor	Poor	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Fair	Fair	Poor	Fair	Good	Poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Poor	Fair	Very poor.
Very poor	Very poor	Very poor	Very poor	Poor	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.

TABLE 5.—*Suitability of the soils for elements of*

Soil series and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees
LIF	Very poor	Very poor	Fair	Fair
For Berks parts of LkB, LkB3, LkC, LkC3, LkD, LkD3, LkE, and LkF, see Berks series.				
For Dekalb parts of LIC, LID, LIE, and LIF, see Dekalb series.				
Lindside: Ln	Fair	Good	Good	Good
Lithic Udorthents-Rock outcrop complex: LR.				
Too variable to be rated.				
Melvin: Me	Poor	Fair	Fair	Good
Monongahela:				
MhA	Fair	Good	Good	Good
MhB, MhC	Fair	Good	Good	Good
MhC3	Poor	Fair	Good	Good
Murrill:				
MIB, MIC	Fair	Good	Good	Good
MID	Poor	Fair	Good	Good
MsC, MsD, MsE	Very poor	Poor	Good	Good
Murrill variant:				
MvB	Good	Good	Good	Good
MvC	Fair	Good	Good	Good
MvD	Poor	Fair	Good	Good
Opequon-Rock outcrop complex:				
OpD, OpF	Very poor	Poor	Fair	Fair
OpD3	Very poor	Poor	Fair	Fair
Philo: Pf, Pg, Ph	Fair	Good	Good	Good
Pope: Pm, Po, Ps	Fair	Good	Good	Good
Purdy: Pu	Very poor	Poor	Poor	Good
Ramsey:				
RdD	Very poor	Very poor	Fair	Fair
RdF	Very poor	Very poor	Poor	Poor
For Dekalb parts of RdD and RdF, see Dekalb series.				
Rubble land: Rn.				
Too variable to be rated.				
Rushtown: RuD, RuF	Very poor	Poor	Poor	Poor
Schaffenaker: ShC, ShE, ShF	Very poor	Very poor	Fair	Fair
Strip mine: SM.				
Too variable to be rated.				
Tygart: Tg	Poor	Poor	Fair	Fair
Typic Dystrochrepts: TPC, TPE	Very poor	Very poor	Poor	Poor
Udifluvents and Fluvaquents: UF.				
Too variable to be rated.				
Weikert:				
WeB3, WeC3, WeD3	Very poor	Poor	Fair	Fair
WeE3, WeF3	Very poor	Very poor	Fair	Fair
WkB, WkC	Poor	Poor	Fair	Fair
WkD, WkE	Very poor	Poor	Fair	Fair
WkF	Very poor	Very poor	Fair	Fair
For Berks parts of WkB, WkC, WkD, WkE, and WkF, see Berks series.				
Wharton:				
WnB, WnC	Fair	Good	Good	Good
WoC	Very poor	Poor	Good	Good

The seven elements of wildlife habitat rated in table 5 are described in the following paragraphs.

Grain and seed crops.—These crops include such seed-producing annuals as corn, sorghum, wheat, barley, oats, millet, buckwheat, cowpeas, and other plants commonly grown for grain or seed. The major soil properties affecting this habitat element are effective rooting depth, available water capacity, natural drainage, slope, surface stoniness, hazard of flooding, and texture of the surface layer and subsoil.

Grasses and legumes.—Making up this group are domestic perennial grasses and herbaceous legumes that are established by planting. They furnish wildlife food and cover. Among the plants are bluegrass, fescue, brome, timothy, orchardgrass, reed canarygrass, clover, and alfalfa. The major soil properties affecting this habitat element are effective rooting depth, available water capacity, natural drainage, slope, surface stoniness, hazard of flooding, and texture of the surface layer and subsoil.

Wild herbaceous plants.—In this group are native or introduced perennial grasses and weeds that generally are established naturally. They include bluestem, quackgrass, panicgrass, goldenrod, wild carrot, nightshade,

wildlife habitat and kinds of wildlife—Continued

Elements of wildlife habitat—Continued			Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow-water areas	Openland	Woodland	Wetland
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Poor	Poor	Good	Good	Poor.
Fair	Fair	Poor	Fair	Good	Poor.
Poor	Poor	Poor	Good	Good	Poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Fair	Fair	Very poor.
Very poor	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Poor	Poor	Good	Good	Poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Good	Good	Good	Poor	Good	Good.
Fair	Very poor	Very poor	Poor	Poor	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Good	Very poor	Very poor	Poor	Poor	Very poor.
Fair	Very poor	Very poor	Poor	Poor	Very poor.
Fair	Good	Good	Poor	Fair	Good.
Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Very poor	Very poor	Good	Good	Very poor.
Very poor	Very poor	Very poor	Poor	Fair	Very poor.

and dandelion. They provide food and cover principally to upland forms of wildlife. The major soil properties affecting this habitat element are effective rooting depth, available water capacity, natural drainage, surface stoniness, hazard of flooding or ponding, and texture of the surface layer and subsoil.

Hardwood trees.—This element includes nonconiferous trees, shrubs, and woody vines that produce nuts or other fruits, buds, catkins, twigs, or foliage that wildlife eat. They are generally established naturally but can be planted. Among the native kinds are oak, cherry, maple, poplar, apple, hawthorn, dogwood, persimmon, sumac, sassafras, hazelnut, black walnut, hickory, sweetgum, bayberry, blueberry, huckleberry, blackhaw, viburnum, and grape. The major soil properties affecting this habitat element are effective rooting depth, available water capacity, and natural drainage.

Also in this group are several varieties of fruiting shrubs that are raised commercially for planting. Autumn-olive, Amur honeysuckle, Tatarian honeysuckle, crabapple, highbush cranberry, and silky cornel dogwood are some of the shrubs that generally are available and can be planted on soils that are rated

well suited. Hardwoods that are not available commercially can commonly be transplanted successfully.

Coniferous plants.—This element consists of cone-bearing evergreen trees and shrubs that are used by wildlife primarily as cover, though they also provide browse and seeds or fruitlike cones. Among them are Norway spruce, Virginia pine, loblolly pine, shortleaf pine, pond pine, Scotch pine, redcedar, and Atlantic white-cedar. Generally, the plants are established naturally in areas where cover of weeds and sod is thin, but they can also be planted. The major soil properties affecting this habitat element are effective rooting depth, available water capacity, and natural drainage.

Wetland plants.—Making up this group are wild, herbaceous annual and perennial plants that grow on moist to wet sites, exclusive of submerged or floating aquatics. They produce food and cover extensively used mainly by wetland forms of wildlife. They include smartweed, wild millet, bulrush, sedges, barnyard grass, pondweed, duckweed, duckmillet, arrow-arum, pickerelweed, waterwillow, wetland grasses, wildrice, and cattails. The major soil properties affecting this habitat element are natural drainage, surface stoniness, slope, and texture of the surface layer and subsoil.

Shallow-water areas.—These are areas of shallow water, generally not exceeding 5 feet in depth, near food and cover for wetland wildlife. They may be natural wet areas or those created by dams or levees or by water-control devices in marshes or streams. Examples of such developments are wildlife ponds, beaver ponds, muskrat marshes, waterfowl feeding areas, and wildlife watering developments. The major soil properties affecting this habitat element are depth to bedrock, natural drainage, slope, surface stoniness, and permeability. Natural wet areas that are fed by aquifers are rated on the basis of drainage class without regard to permeability. Permeability of the soil applies only for those nonaquifer areas with a potential for development, and water is assumed to be available offsite.

The three general kinds of wildlife rated in table 5 are briefly described in the following paragraphs.

Openland wildlife.—Examples of openland wildlife are quail, pheasant, meadowlark, field sparrow, dove, cottontail rabbit, red fox, and woodchuck. These birds and mammals generally make their home in areas of cropland, pasture, meadow, and lawns and in areas overgrown with grasses, herbs, shrubs, and vines.

Woodland wildlife.—Among the birds and mammals that prefer woodland are ruffed grouse, woodcock, thrush, vireo, scarlet tanager, gray and red squirrel, gray fox, white-tailed deer, raccoon, and wild turkey. They obtain food and cover in stands of hardwoods, coniferous trees, shrubs, or a mixture of these plants.

Wetland wildlife.—Ducks, geese, rails, herons, shore birds, and muskrat are familiar examples of birds and mammals that generally make their home in wet areas, such as ponds, marshes, and swamps.

Each rating under "Kinds of Wildlife" in table 5 is based on the ratings listed for the habitat elements in the first part of the table. For openland wildlife the rating is based on the ratings shown for grain and seed crops, domestic grasses and legumes wild herbaceous upland plants and either hardwood woody plants or coniferous woody plants, whichever is applicable. The rating for woodland wildlife is based on the ratings listed for domestic grasses and legumes, wild herbaceous upland plants, and either hardwood woody plants or coniferous woody plants, whichever is applicable. For wetland wildlife the rating is based on the ratings shown for wetland food and cover plants and shallow-water areas.

Engineering Uses of the Soils [4]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. The soils information in this section can be used as a guide in planning, design, and construction. Among those who can benefit from this section are planning commissioners, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, drainage condition, shrink-swell potential, grain size, plasticity, and reaction (*7*). Also important are depth to the water table, depth to bedrock, and slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan surface and subsurface farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with structures that will be constructed with or on similar soils.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.
8. Select available soils and use them in accordance with their soil mechanics characteristics.

Most of the information in this section is presented in tables 6, 7, and 8, which show, respectively, several estimated soil properties significant to engineering; interpretations for various engineering uses; and results of engineering laboratory tests on soil samples.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 7 and 9, and it also can be used to make other useful maps.

[4] JAMES L. DOVE, State conservation engineer, Soil Conservation service, helped to prepare this section.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works, especially works that involve heavy loads or require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meanings for soil scientists, and they may not be familiar to engineers. The Glossary defines many of these terms commonly used in soil science.

Engineering classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*3*), used by SCS engineers, the Department of Defense, and others, and the AASHTO system (*2*), adopted by the American Association of State Highway and Transportation Officials.

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and organic-matter content. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, ML–CL.

The AASHTO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHTO classification for tested soils, with group index numbers in parentheses, is shown in table 8; the estimated classification, without group index numbers, is given in table 6 for all soils mapped in the survey area.

Engineering properties

Several estimated soil properties significant in engineering are given in table 6. These estimates are made for typical soil profiles, by layers different enough to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 6.

Depth to bedrock is distance from the surface of the soil to the upper surface of the rock layer.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 6 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added; for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of soil characteristics observed in the field, particularly structure and texture. The estimates in table 6 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Engineering interpretations

The estimated interpretations in table 7 are based on the engineering properties of soils shown in table 6, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Hampshire, Mineral, and Morgan Counties. In table 7, ratings are used to summarize limitation or suitability of the soils for winter grading, potential frost action, source of topsoil, and source of road fill. For all other particular uses, table 7 lists those soil features not to be overlooked in planning, installation, and maintenance.

Winter grading is affected chiefly by soil features that are relevant to moving, mixing, and compacting soil in road building when temperatures are below freezing.

TABLE 6.—*Estimated soil properties*

[An asterisk in the first column indicates at least one mapping unit in this series is made up of two or more kinds of soil. The soils structions for referring to other series that appear in the first column of

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHTO
	Feet	*Feet*	*Inches*			
Albrights: AbB, AbC	>3½	1½–2½	0–7	Silt loam	ML, CL	A–4
			7–21	Silt loam, clay loam	ML, CL, GM, GC	A–4, A–6
			21–50	Clay loam, channery loam	GM, GC, SM, SC, ML, CL	A–2, A–4, A–6
			50–55	Very channery loam	GM, SM, ML	A–2, A–4
			55	Sandstone and shale.		
Allegheny: AfB, AgB, AgC	>4	>4	0–14	Fine sandy loam, loam	SM, ML	A–2, A–4
			14–39	Clay loam, sandy clay loam	CL, ML, SM	A–4, A–6
			39–50	Gravelly sandy loam	SM, GM, ML	A–2, A–4
*Andover: ArB For Brinkerton part, see Brinkerton series.	>4½	0	0–22	Loam, channery sandy clay loam.	SM, SC, ML, CL	A–4
			22–42	Sandy clay loam	SM, SC, ML, CL	A–2, A–4
			42–54	Very channery loam	GM, SM, ML	A–2, A–4
			54	Sandstone.		
Atkins: At, Ay	>4	0	0–10	Silt loam, silty clay loam	ML, CL	A–4, A–6
			10–40	Clay loam	SM, SC, ML, CL	A–4, A–6
			40–55	Stratified sandy loam, silty clay loam, silt loam.	SM, SC, ML, CL	A–2, A–4, A–6
Berks: BcB, BcC, BcC3, BcD, BcD3, BcE, BcE3, BcF, BkB, BkC, BkC3, BkD, BkD3, BkE3, BkF.	2–3	>3	0–9	Channery silt loam	ML, GM	A–2, A–4
			9–26	Very channery silt loam	GM, SM	A–2, A–4
			26	Shale and siltstone.		
Braddock: BrB, BrC	>5	>4	0–14	Gravelly loam, silt loam	SM, ML	A–2, A–4
			14–42	Clay loam, gravelly clay loam	SC, ML	A–4, A–6
			42–60	Very gravelly sandy clay loam.	SC, SM, GC, GM	A–2, A–4, A–6
Brinkerton: BsB	>4	0–½	0–7	Silt loam	ML, CL	A–4, A–6
			7–21	Silty clay loam	ML, CL, MH, CH	A–4, A–6, A–7
			21–45	Silty clay loam, shaly silty clay loam.	ML, CL, MH	A–4, A–6, A–7
			45–50	Very shaly loam	CL, SC, ML	A–4, A–6, A–7
Buchanan: BuB, BuC, BvC, BvD.	>5	1½–2½	0–14	Channery loam, loam	ML, CL, GM, SM	A–2, A–4
			14–26	Sandy clay loam	SC, CL, SM, ML	A–2, A–4, A–6
			26–52	Channery sandy clay loam, very channery sandy clay loam.	GM, GC, SM, SC, ML, CL	A–2, A–4, A–6
Calvin: CaD, CbC, CcF	2–3	>3	0–24	Channery silt loam	ML, CL, GM, SM, SC	A–4, A–2
			24–30	Very channery silt loam	GM, GC, SM, SC	A–1, A–2, A–4
			30	Shale.		
Chagrin: Cg	>4	>3	0–10	Fine sandy loam	SM, ML	A–2, A–4
			10–32	Loam	ML, SM	A–4, A–6
			32–50	Fine sandy loam	ML, SM	A–2, A–4

significant to engineering

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the in-
this table. The symbol < means less than; the symbol > means more than]

Coarse fraction greater than 3 inches	Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
Percent					*Inches per hour*	*Inches per inch of soil*	*pH*	
0–5	80–100	80–100	70–95	60–90	0.6–2.0	0.14–0.20	4.5–6.0	Low.
0–5	65–95	55–85	50–80	40–80	0.6–2.0	0.10–0.14	4.5–5.5	Low.
5–15	65–95	55–85	45–80	30–75	0.2–0.6	0.06–0.10	4.5–5.5	Low.
5–20	45–85	40–80	35–70	25–70	0.6–2.0	0.04–0.08	4.5–6.0	Low.
	75–100	70–100	50–100	30–80	0.6–6.0	0.10–0.18	4.5–5.5	Low.
0–10	70–100	70–95	65–95	45–95	0.6–2.0	0.10–0.14	4.5–5.5	Low to moderate.
0–30	50–95	50–90	40–80	15–75	0.6–6.0	0.08–0.14	4.5–5.5	Low.
0–10	80–95	65–90	60–85	45–75	0.6–6.0	0.14–0.20	4.5–5.5	Low.
0–10	80–95	65–90	60–85	30–60	0.06–0.2	0.08–0.12	4.5–5.5	Low.
5–20	70–85	60–80	55–70	25–55	0.2–0.6	0.06–0.10	4.5–5.5	Low.
----	90–100	90–100	85–100	60–95	0.6–2.0	0.18–0.22	4.5–5.5	Low.
----	85–100	80–100	55–75	40–75	0.2–0.6	0.14–0.18	4.5–5.5	Low.
----	60–95	60–80	50–70	15–60	0.2–6.0	0.08–0.16	4.5–5.5	Low.
0–10	45–70	40–70	35–60	25–60	2.0–6.0	0.08–0.12	4.5–5.5	Low.
5–20	40–65	35–55	20–45	15–45	2.0–6.0	0.06–0.10	4.5–5.5	Low.
0	80–95	70–95	40–75	30–70	2.0–6.0	0.12–0.15	4.5–5.5	Low.
0	85–95	75–95	45–70	40–60	0.6–2.0	0.12–0.15	4.5–5.5	Low to moderate.
0–10	80–95	50–85	30–65	25–60	0.6–2.0	0.12–0.15	4.5–5.5	Low.
0	90–100	85–100	85–100	75–100	0.6–2.0	0.18–0.24	4.5–5.5	Low.
0	90–100	85–100	85–100	65–95	0.2–0.6	0.14–0.18	4.5–5.5	Moderate.
0	80–100	70–100	60–100	55–90	0.06–0.2	0.08–0.12	4.5–5.5	Moderate.
5–15	70–100	60–100	45–90	40–90	0.2–2.0	0.06–0.10	5.1–6.0	Low.
0–10	65–100	60–95	55–80	30–70	0.6–6.0	0.12–0.18	<4.5–5.5	Low.
0–10	65–100	60–95	55–80	30–70	0.6–2.0	0.10–0.16	<4.5–5.5	Low.
5–20	45–95	40–95	35–70	20–55	0.06–0.2	0.06–0.10	<4.5–5.5	Low.
0–15	70–100	55–95	50–90	20–75	2.0–6.0	0.10–0.16	4.5–5.5	Low.
5–20	35–75	35–60	15–45	15–40	2.0–6.0	0.06–0.10	4.5–5.5	Low.
0	95–100	95–100	80–100	30–65	0.6–6.0	0.12–0.16	5.6–7.3	Low.
0	95–100	95–100	80–100	45–75	0.6–2.0	0.14–0.18	5.6–7.3	Low.
0	85–95	60–95	45–90	20–55	2.0–6.0	0.08–0.12	5.6–7.3	Low.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHTO
	Feet	*Feet*	*Inches*			
Clarksburg: CkB, CkC, ClC, ClD.	>5	1½–2½	0–12	Channery silt loam, silt loam	ML	A–4
			12–29	Silty clay loam	ML, CL	A–4, A–6, A–7
			29–52	Clay loam	CL, SC, ML	A–4, A–6, A–7
*Dekalb: DlC, DlE, DlF. For Lehew part, see Lehew series.	2–3	>4	0–8	Sandy loam	GM, SM, ML	A–2, A–4
			8–24	Channery sandy loam	GM, SM, ML	A–2, A–4
			24–27	Very channery sandy loam	GM, SM	A–2, A–4
			27	Sandstone.		
Dunning: Du	>3½	0	0–12	Silty clay loam	ML, CL	A–6
			12–46	Clay, silty clay	CH, CL	A–6, A–7
			46–58	Stratified silty clay, clay loam, gravelly sandy loam, silt loam.	CL, CH	A–4, A–6, A–7
Edom: EaC, EaD, EaE, EbC3, EbD3, EbF3.	>3½	>4	0–11	Silt loam, silty clay loam	CL, ML	A–4, A–6
			11–35	Silty clay, shaly clay	CH, CL	A–4, A–6, A–7
			35–42	Very shaly silty clay loam	GC, GM	A–2
			42	Shale, thin limestone.		
Edom variant: EcC, EcD, EcE, EdC3, EdD3.	1½–3	>4	0–6	Silt loam, silty clay loam	CL, ML	A–4, A–6
			6–20	Silty clay loam, silty clay, shaly silty clay.	CH, CL	A–4, A–6, A–7
			20–23	Very shaly silty clay	GC, GM	A–2
			23	Shale.		
Elliber: ElC, ElD, ElE, EmE, EmF.	>4	>4	0–50	Loam, very cherty loam	GM, GC	A–1, A–2, A–4
			50–70	Very cherty sandy loam	GM, GC	A–1, A–2, A–4
Ernest: ErB, ErC, Es	>3½	1½–2½	0–12	Silt loam	ML, CL	A–4, A–6
			12–28	Silty clay loam	CL, ML	A–4, A–6, A–7
			28–46	Shaly clay loam	CL, GM, SM, ML	A–4, A–6
			46	Shale.		
Fluvaquents: FA. Too variable to be rated.						
Gilpin: GlB, GlC, GlD, GlE, GmC, GmF.	2–3	>3	0–10	Silt loam	ML	A–4
			10–25	Silty clay loam, shaly silty clay loam.	ML, CL	A–4, A–6
			25–30	Very shaly silt loam	ML, GM, CL, GC, SM, SC	A–2, A–4
			30	Shale.		
Huntington: Hu	>4	>3	0–52	Loam, silt loam	ML, CL	A–4, A–6
			52–64	Stratified silt loam, sandy loam, sandy clay loam.	ML, SC, SM	A–2, A–4
Laidig: LaB, LaC, LaD, LbC, LbD, LcE.	>5	>3	0–13	Channery loam, loam	GM, SM	A–2, A–4
			13–36	Sandy clay loam, channery sandy clay loam.	SC, GM, SM	A–2, A–4
			36–62	Channery sandy clay loam, channery sandy loam, channery fine sandy loam.	GM, SM, SC	A–2, A–4
*Lehew: LeB, LeB3, LeC, LeC3, LeD, LeD3, LeE, LeF, LkB, LkB3, LkC, LkC3, LkD, LkD3, LkE, LkF, LlC, LlD, LlE, LlF. For Berks part of LkB, LkB3, LkC, LkC3, LkD, LkD3, LkE, LkF, see Berks series. For Dekalb part of LlC, LlD, LlE, LlF, see Dekalb series.	2–3	>3	0–6	Channery fine sandy loam, flaggy fine sandy loam.	GM, GC, ML	A–2, A–4
			6–32	Very channery fine sandy loam, channery fine sandy loam.	GM, SM	A–2, A–4
			32	Sandstone.		

significant to engineering—Continued

Coarse fraction greater than 3 inches	Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
Percent					*Inches per hour*	*Inches per inch of soil*	*pH*	
0–5	80–100	75–95	70–90	50–85	0.6–6.0	0.15–0.20	5.1–6.5	Low.
0–5	80–100	80–95	75–90	50–85	0.2–0.6	0.12–0.14	5.1–6.5	Moderate.
0–10	70–100	50–85	40–80	40–75	0.06–0.2	0.06–0.12	5.1–6.5	Moderate.
5–15	50–75	40–75	35–65	15–55	2.0–6.0	0.08–0.12	4.5–5.5	Low.
10–25	50–75	40–80	40–75	20–55	2.0–6.0	0.06–0.12	4.5–5.5	Low.
10–40	40–85	35–75	25–65	15–40	2.0–6.0	0.05–0.10	4.5–5.5	Low.
0	95–100	90–100	85–100	75–100	0.2–0.6	0.18–0.27	5.6–7.3	Moderate.
0	95–100	90–100	85–100	80–100	0.06–0.2	0.12–0.18	5.6–7.3	Moderate to high.
0	95–100	90–100	80–100	65–95	0.06–0.2	0.12–0.18	5.6–7.3	Moderate to high.
0	85–100	80–100	75–95	65–85	0.6–6.0	0.14–0.20	5.1–6.0	Low.
0–10	70–95	65–90	60–85	55–85	0.6–2.0	0.10–0.14	5.6–7.3	Moderate to high.
10–20	25–55	20–40	15–40	15–35	0.6–2.0	0.04–0.08	5.6–7.3	Low.
0	85–100	80–100	75–95	65–85	0.6–6.0	0.14–0.20	5.1–6.0	Low.
0–10	70–95	65–90	60–85	55–85	0.6–2.0	0.10–0.14	5.6–7.3	Moderate to high.
10–20	25–55	20–40	15–40	15–35	0.6–2.0	0.04–0.08	5.6–7.3	Low.
10–40	30–60	20–55	15–45	10–40	2.0–6.0	0.06–0.10	<4.5–5.5	Low.
10–40	30–55	20–50	15–45	10–40	2.0–6.0	0.06–0.10	<4.5–5.5	Low.
0–5	75–100	70–100	70–95	60–95	0.6–2.0	0.14–0.20	4.5–5.5	Low.
0–5	75–100	75–100	70–95	65–95	0.6–2.0	0.12–0.16	4.5–5.5	Moderate.
5–15	70–95	55–95	50–95	40–95	0.2–0.6	0.08–0.12	4.5–5.5	Moderate.
0–5	85–95	80–90	70–85	65–80	0.6–2.0	0.12–0.18	4.5–5.5	Low.
0–5	70–90	65–85	55–75	55–70	0.6–2.0	0.10–0.16	4.5–5.5	Moderate.
0–10	40–70	35–65	25–65	25–60	0.6–2.0	0.06–0.10	4.5–5.5	Low.
0	95–100	95–100	85–100	70–95	0.6–2.0	0.18–0.20	5.6–7.3	Low.
0	85–95	60–80	50–70	10–60	0.6–6.0	0.10–0.14	5.6–7.3	Low.
5–10	55–75	45–75	40–60	20–45	0.6–6.0	0.10–0.14	4.5–5.5	Low.
5–10	60–90	60–85	40–60	20–45	0.6–2.0	0.08–0.12	4.5–5.5	Low.
5–20	60–75	60–70	40–60	15–40	0.2–0.6	0.06–0.10	4.5–5.5	Low.
5–15	50–80	45–70	40–65	25–55	2.0–6.0	0.08–0.12	4.5–5.5	Low.
10–35	45–60	35–50	30–45	15–40	2.0–6.0	0.06–0.10	4.5–5.5	Low.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHTO
	Feet	*Feet*	*Inches*			
Lindside: Ln	>5	1½–2	0–48	Silt loam, silty clay loam	ML, CL	A–4, A–6
			48–60	Stratified silty clay loam, fine sandy loam, silt loam.	ML, SM, CL	A–2, A–4, A–6
Lithic Udorthents-Rock outcrop complex: LR. Too variable to be rated.						
Melvin: Me	>4	0	0–24	Silt loam, silty clay loam	ML, CL	A–4, A–6
			24–50	Silty clay loam	ML, CL, SM	A–2, A–4, A–6
Monongahela: MhA, MhB, MhC, MhC3.	>4	1½–2½	0–13	Silt loam	ML	A–4
			13–26	Silt loam	CL, ML	A–4, A–6
			26–50	Clay loam, sandy clay loam	CL, ML, SM, SC	A–4, A–6
Murrill: MlB, MlC, MlD, MsC, MsD, MsE.	>6	>3	0–13	Loam, channery loam	ML, SM, GM	A–4
			13–43	Channery loam, channery sandy clay loam.	ML, CL, GM, GC, SM, SC	A–4, A–6
			43–60	Silty clay	MH, CL, CH	A–6, A–7
Murrill variant: MvB, MvC, MvD.	>5	>3	0–13	Channery loam	ML, SM, GM	A–4
			13–23	Silt loam	ML, SM, GM, CL, GC, SC	A–4, A–6
			23–51	Silty clay	MH, CL, CH	A–6, A–7
			51–60	Shaly silty clay loam	GC, CL, MH, CH	A–6, A–7
Opequon-Rock outcrop complex: OpD, OpD3, OpF.	1–1½	>3	0–6	Silty clay loam, silty clay	CL, ML, MH	A–4, A–6, A–7
			6–16	Silty clay, clay	CH, MH, CL	A–6, A–7
			16	Limestone.		
Philo: Pf, Pg, Ph	>3½	1½–2	0–38	Fine sandy loam, gravelly loam, silt loam.	ML, SM	A–4
			38–60	Stratified sandy loam, silt loam, clay loam.	SM, ML, GM	A–2, A–4
Pope: Pm, Po, Ps	>3½	>3	0–42	Fine sandy loam, gravelly sandy loam, silt loam.	ML, SM	A–4
			42–60	Stratified loamy sand, sandy loam.	SM, GM	A–2, A–4
Purdy: Pu	>4	0	0–7	Silty clay loam	ML, CL	A–4, A–6
			7–35	Silty clay, clay	CL, CH	A–6, A–7
			35–50	Stratified silty clay loam, clay loam, clay.	CL, CH	A–6, A–7
*Ramsey: RdD, RdF For Dekalb part, see Dekalb series.	1–1½	>3	0–8	Sandy loam	ML, SM	A–1, A–2, A–4
			8–17	Channery sandy loam	GM	A–1, A–2
			17	Sandstone.		
Rubble land: Rn. Too variable to be rated.						
Rushtown: RuD, RuF	>5	>4	0–21	Shaly silt loam	GM	A–2
			21–60	Very shaly silt loam	GM	A–2
Schaffenaker: ShC, ShE, ShF	2–3	>3	0–38	Loamy sand	SP, SM	A–2, A–3
			38	Sandstone.		
Strip mine: SM. Too variable to be rated.						
Tygart: Tg	>4	½–1½	0–9	Silt loam	ML, CL	A–4, A–6
			9–52	Silty clay loam, silty clay	ML, CL, CH	A–6, A–7

significant to engineering—Continued

Coarse fraction greater than 3 inches	Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
Percent					*Inches per hour*	*Inches per inch of soil*	*pH*	
0	100	95–100	90–100	85–95	0.6–2.0	0.18–0.24	5.6–6.5	Low.
0	100	95–100	55–95	30–90	0.6–6.0	0.14–0.18	5.6–6.5	Low.
0	90–100	90–100	90–100	65–90	0.2–2.0	0.18–0.22	6.1–7.3	Moderate.
0	70–100	70–100	65–90	25–80	0.2–0.6	0.12–0.18	6.1–7.3	Moderate.
0	90–100	85–100	80–100	70–90	0.6–2.0	0.18–0.24	4.5–5.5	Low.
0	90–100	90–100	80–100	70–90	0.6–2.0	0.14–0.18	4.5–5.5	Low.
0–10	80–100	75–100	70–100	45–95	0.2–0.6	0.08–0.12	4.5–5.5	Low.
0–5	60–80	55–70	50–70	40–65	0.6–2.0	0.12–0.16	4.5–5.5	Low.
0–10	70–95	70–85	60–80	45–80	0.6–2.0	0.10–0.14	4.5–5.5	Low.
0	95–100	95–100	85–100	70–100	0.6–2.0	0.08–0.12	4.5–6.5	High.
0–5	60–80	55–70	50–70	40–65	0.6–2.0	0.12–0.16	4.5–5.5	Low.
0–10	70–95	70–85	60–80	45–80	0.6–2.0	0.10–0.14	4.5–5.5	Moderate.
0	95–100	95–100	85–100	70–100	0.6–2.0	0.08–0.12	4.5–5.5	Moderate.
0–5	65–90	60–85	50–75	45–75	0.6–2.0	0.08–0.12	4.5–5.5	Moderate.
0–5	85–100	80–100	75–100	75–90	0.6–2.0	0.16–0.20	5.6–7.3	Moderate.
0	80–100	80–100	75–100	70–95	0.2–0.6	0.12–0.16	5.6–7.3	High.
0	95–100	90–100	70–90	45–80	0.2–2.0	0.14–0.18	5.1–6.0	Low.
0	60–85	50–70	45–60	30–55	2.0–6.0	0.06–0.10	5.1–6.0	Low.
0	75–100	70–100	55–85	40–65	0.6–6.0	0.12–0.16	4.5–5.5	Low.
0–5	50–75	45–60	40–55	20–45	2.0–6.0	0.06–0.10	4.5–5.5	Low.
0	95–100	90–100	90–100	90–100	0.2–0.6	0.18–0.24	4.5–5.5	Low.
0	95–100	90–100	85–100	75–95	0.06–0.2	0.12–0.16	4.5–5.5	Moderate.
0	95–100	90–100	85–95	70–95	0.06–0.2	0.10–0.14	4.5–5.5	Moderate.
0–5	80–100	75–100	45–75	30–75	6.0–20.0	0.09–0.12	4.5–5.5	Low.
5–40	80–100	50–80	30–65	5–20	6.0–20.0	0.06–0.10	4.5–5.5	Low.
0	30–40	30–40	20–35	15–25	>6.0	0.06–0.10	4.5–5.5	Low.
0	15–25	15–25	15–25	10–20	>6.0	0.03–0.05	4.5–5.5	Low.
0–10	80–100	70–100	30–65	5–35	>6.0	0.04–0.06	<4.5–5.5	Low.
0	90–100	90–100	85–95	80–95	0.6–2.0	0.18–0.22	5.1–6.0	Low.
0	90–100	90–100	85–95	80–95	0.06–0.2	0.10–0.14	<4.5–5.5	Moderate.

TABLE 6.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHTO
	Feet	*Feet*	*Inches*			
Typic Dystrochrepts: TPC, TPE. Too variable to be rated.						
Udifluvents: UF. Too variable to be rated. Fluvaquent part is too variable to be rated.						
*Weikert: WeB3, WeC3, WeD3, WeE3, WeF3, WkB, WkC, WkD, WkE, WkF. For Berks part of WkB, WkC, WkD, WkE, and WkF, see Berks series.	1–1½	>3	0–5 5–13 13	Shaly silt loam Very shaly silt loam Shale.	ML, GM GM	A–2, A–4 A–1, A–2
Wharton: WnB, WnC, WoC	>3½	1½–2	0–10 10–42 42–48 48	Silt loam Silty clay loam, shaly silty clay loam. Very shaly silty clay loam Shale and siltstone	ML, CL ML, CL, CH, MH ML, CL, CH, MH, GC	A–4, A–6 A–6, A–7 A–4, A–6, A–7

TABLE 7.—*Interpretations of*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The instructions for referring to other series

Soil series and map symbols	Suitability for winter grading	Potential frost action	Suitability as source of—		Soil features affecting—	
			Topsoil	Road fill	Highway location	Pond reservoir areas
Albrights: AbB, AbC	Poor	Moderate	Fair	Fair	Seasonal high water table at a depth of 1½ to 2½ feet; seepage.	Pervious material in substratum in places.
Allegheny: AfB, AgB, AgC	Fair	Moderate	Good to fair.	Good	No adverse features	Pervious material in substratum.
*Andover: ArB For Brinkerton part, see Brinkerton series.	Poor	High	Poor	Poor to fair.	Seasonal high water table at or near the surface.	Pervious material in substratum in places; seasonal high water table at or near the surface.
Atkins: At, Ay	Unsuitable	High	Fair to poor.	Poor	Seasonal high water table at or near the surface; flooding.	Pervious material in substratum; seasonal high water table at or near the surface; flooding.
Berks: BcB, BcC, BcC3, BcD, BcD3, BcE, BcE3, BcF, BkB, BkC, BkC3, BkD, BkD3, BkE3, BkF.	Fair	Moderate	Fair to poor.	Fair to good.	Rippable bedrock at a depth of 2 to 3 feet.	Pervious material in substratum; rippable bedrock at a depth of 2 to 3 feet.

significant to engineering—Continued

Coarse fraction greater than 3 inches	Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
Percent					*Inches per hour*	*Inches per inch of soil*	*pH*	
0–10	35–70	35–65	25–60	20–55	2.0–6.0	0.08–0.14	4.5–5.5	Low.
0–20	25–55	20–40	10–35	5–25	2.0–6.0	0.04–0.08	4.5–5.5	Low.
0–5	95–100	90–100	80–95	70–95	0.6–2.0	0.16–0.20	4.5–5.5	Low.
0–5	70–95	60–90	55–90	50–85	0.06–0.6	0.14–0.18	4.5–5.5	Moderate.
0–10	60–90	40–85	40–85	40–80	0.06–0.6	0.08–0.12	<4.5–5.0	Moderate.

engineering properties of the soils

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the that appear in the first column of this table]

Soil features affecting—Continued				
Embankments and dikes	Drainage for crops and pasture	Irrigation	Terraces and diversions	Shallow excavations
Fair stability	Seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability; moderate to low available water capacity.	Seasonal high water table at a depth of 1½ to 2½ feet; seepage.	Seasonal high water table at a depth of 1½ to 2½ feet.
Fair stability; pervious material in substratum.	Well drained	No adverse features	No adverse features	No adverse features.
Stable; stony	Seasonal high water table at or near the surface; slow permeability.	Seasonal high water table at or near the surface; slow permeability; stones.	Seasonal high water table at or near the surface; stony.	Seasonable high water table at or near the surface; stony.
Poor stability; erodible	Seasonal high water table at or near the surface; slow permeability; flooding; a lack of outlets.	Seasonal high water table at or near the surface; slow permeability; flooding.	Not generally needed	Seasonal high water table at or near the surface; flooding.
Fair to good stability; pervious material in substratum.	Well drained	Low to moderate available water capacity; moderately rapid permeability; rippable bedrock at a depth of 2 to 3 feet.	Rippable bedrock at a depth of 2 to 3 feet.	Rippable bedrock at a depth of 2 to 3 feet.

TABLE 7.—*Interpretations of engineering*

Soil series and map symbols	Suitability for winter grading	Potential frost action	Suitability as source of—		Soil features affecting—	
			Topsoil	Road fill	Highway location	Pond reservoir areas
Braddock: BrB, BrC	Fair	Moderate	Fair to good.	Fair to good.	No adverse features	Pervious material in substratum.
Brinkerton: BsB	Unsuitable	High	Fair. Poor for Brinkerton part of ArB.	Poor	Seasonal high water table at or near the surface.	Seasonal high water table at or near the surface.
Buchanan: BuB, BuC, BvC, BvD.	Poor	Moderate	Fair for BuB and BuC. Poor for BvC and BvD.	Fair	Seasonal high water table at a depth of 1½ to 2½ feet; seepage.	Pervious material in substratum in places.
Calvin: CaD, CbC, CcF	Fair	Moderate	Fair to poor.	Fair to good.	Rippable bedrock at a depth of 2 to 3 feet.	Pervious material in substratum.
Chagrin: Cg	Poor to fair	Moderate	Fair to good.	Fair	Flooding	Pervious material in substratum.
Clarksburg: CkB, CkC, ClC, ClD	Poor	Moderate	Fair	Fair to poor.	Seasonal high water table at a depth of 1½ to 2½ feet; seepage.	Low seepage losses
Dekalb: DlC, DlE, DlF. Interpretations are the same for the Lehew very stony soils as for the very stony Dekalb soils.	Good	Low	Poor	Good to fair.	Bedrock at a depth of 2 to 3 feet.	Pervious material; bedrock at a depth of 2 to 3 feet.
Dunning: Du	Unsuitable	High	Fair to poor.	Poor	Seasonal high water table at or near the surface; flooding.	Seasonal high water table at or near the surface; flooding.
Edom: EaC, EaD, EaE, EbC3, EbD3, EbF3.	Poor	Moderate	Fair to poor.	Fair	Bedrock at a depth of 3½ feet or more.	Bedrock at a depth of 3½ feet or more.
Edom variant: EcC, EcD, EcE, EdC3, EdD3.	Poor	Moderate	Fair to poor.	Fair	Bedrock at a depth of 2 to 3 feet.	Bedrock at a depth of 2 to 3 feet.
Elliber: ElC, ElD, ElE, EmE, EmF.	Good	Low	Poor	Good to fair.	Bedrock below a depth of 4 feet.	Pervious material
Ernest: ErB, ErC, Es	Poor	Moderate	Fair for ErB and ErC. Poor for Es.	Fair to poor.	Seasonal high water table at a depth of 1½ to 2½ feet; seepage.	Low seepage losses

properties of the soils—Continued

Soil features affecting—Continued				
Embankments and dikes	Drainage for crops and pasture	Irrigation	Terraces and diversions	Shallow excavations
Fair stability; pervious material in substratum.	Well drained	No adverse features	No adverse features	No adverse features.
Poor stability	Seasonal high water table at or near the surface; slow permeability.	Seasonal high water table at or near the surface; slow permeability; stones on surface of Brinkerton part of ArB.	Seasonal high water table at or near the surface; stones on surface of Brinkerton part of ArB.	Seasonal high water table at or near the surface; stones on surface of Brinkerton part of ArB.
Fair stability; stones on surface. of BvC and BvD.	Seasonal high water table at a depth of 1½ to 2½ feet; slow permeability.	Seasonal high water table at a depth of 1½ to 2½ feet; slow permeability; stones on surface of BvC and BvD.	Seasonal high water table at a depth of 1½ to 2½ feet; seepage; stones on surface of BvC and BvD.	Seasonal high water table at a depth of 1½ to 2½ feet; stones on surface of BvC and BvD.
Fair to good stability; stones on surface of CcF.	Well drained	Low to moderate available water capacity; moderately rapid permeability; rippable bedrock at a depth of 2 to 3 feet; stones on surface of CcF.	Rippable bedrock at a depth of 2 to 3 feet; stones on surface of CcF.	Rippable bedrock at a depth of 2 to 3 feet; stones on surface of CcF.
Fair stability; pervious material in substratum.	Well drained	No adverse features	Flooding	Flooding.
Fair stability	Seasonal high water table at a depth of 1½ to 2½ feet; slow permeability.	Seasonal high water table at a depth of 1½ to 2½ feet; slow permeability; moderate available water capacity; stones on surface of CIC and CID.	Seasonal high water table at a depth of 1½ to 2½ feet; seepage; stones on surface of CIC and CID.	Seasonal high water table at a depth of 1½ to 2½ feet; stones on surface of CIC and CID.
Pervious material	Well drained	Low to moderate available water capacity; moderately rapid permeability; bedrock at a depth of 2 to 3 feet; stones.	Bedrock at a depth of 2 to 3 feet; stones.	Bedrock at a depth of 2 to 3 feet; stones.
Poor stability; flooding; erodible.	Seasonal high water table at or near the surface; slow permeability.	Seasonal high water table at or near the surface; slow permeability; flooding.	Seasonal high water table at or near the surface; flooding; erodible.	Seasonal high water table at or near the surface; flooding.
Fair stability	Well drained	Moderate to high available water capacity; bedrock at a depth of 3½ feet or more.	Bedrock at a depth of 3½ feet or more.	Bedrock at a depth of 3½ feet or more.
Fair stability	Well drained	Low to moderate available water capacity; bedrock at a depth of 2 to 3 feet.	Bedrock at a depth of 2 to 3 feet; erodible.	Bedrock at a depth of 2 to 3 feet.
Pervious material; very cherty; stones on surface of EmE and EmF.	Well drained	Moderately rapid permeability; low to moderate available water capacity; stones on surface of EmE and EmF.	Stones on surface of EmE and EmF.	Stones on surface of EmE and EmF.
Fair to poor stability; stones on surface of Es.	Seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability; moderate available water capacity; stones on surface of Es.	Seasonable high water table at a depth of 1½ to 2½ feet; seepage; stones on surface of Es.	Seasonal high water table at a depth of 1½ to 2½ feet; stones on surface of Es.

TABLE 7.—*Interpretations of engineering*

Soil series and map symbols	Suitability for winter grading	Potential frost action	Suitability as source of—		Soil features affecting—	
			Topsoil	Road fill	Highway location	Pond reservoir areas
Fluvaquents: FA	Unsuitable	Moderate	Fair to poor.	Fair to poor.	Seasonal high water table at or near the surface; flooding.	Pervious layers; seasonal high water table at or near the surface; flooding.
Gilpin: GIB, GIC, GID, GIE, GmC, GmF.	Fair	Moderate	Fair for GIB, GIC, GID, and GIE. Poor for GmC and GmF.	Fair	Rippable bedrock at a depth of 2 to 3 feet.	Rippable bedrock at a depth of 2 to 3 feet.
Huntington: Hu	Fair	Moderate	Good	Fair	Flooding	Pervious material in substratum; flooding.
Laidig: LaB, LaC, LaD, LbC, LbD, LcE.	Fair	Low to moderate.	Fair to poor.	Good for LaB, LaC, LaD, LbC, and LbD. Fair for LcE.	Stones on surface of LcE.	Pervious material in substratum in places.
*Lehew: LeB, LeB3, LeC, LeC3, LeD, LeD3, LeE, LeF, LkB, LkB3, LkC, LkC3, LkD, LkD3, LkE, LkF, LIC, LID, LIE, LIF. For Berks part of LkB, LkB3, LkC, LkC3, LkD, LkD3, LkE, and LkF, see Berks series. Interpretations are the same for the Dekalb parts of LIC, LID, LIE, and LIF as for the Lehew parts.	Good	Low	Poor	Good	Bedrock at a depth of 2 to 3 feet.	Pervious material; bedrock at a depth of 2 to 3 feet.
Lindside: Ln	Poor	Moderate	Good	Fair	Seasonal high water table at a depth of 1½ to 2 feet; flooding.	Pervious material in substratum; flooding.
Lithic Udorthents-Rock outcrop complex: LR.	Fair to poor	Moderate	Unsuitable.	Unsuitable.	Bedrock at a depth of less than 1 foot; rock outcrops.	Bedrock at a depth of less than 1 foot; rock outcrops.
Melvin: Me	Unsuitable	High	Fair	Poor	Seasonal high water table at or near the surface; flooding.	Flooding
Monongahela: MhA, MhB, MhC, MhC3.	Poor	Moderate to high.	Fair to good.	Fair	Seasonal high water table at a depth of 1½ to 2½ feet; seepage.	Pervious material in substratum in places.
Murrill: MIB, MIC, MID, MsC, MsD, MsE.	Fair	Moderate	Fair for MIB, MIC, and MID. Poor for MsC, MsD, and MsE.	Good to fair.	Solution channels in underlying bedrock in places.	Pervious material to a depth of 3 to 5 feet; solution channels in underlying bedrock in places.
Murrill variant: MvB, MvC, MvD.	Fair to poor	Moderate	Fair to poor.	Fair to poor.	Solution channels in underlying bedrock in places.	Pervious to a depth of 1½ to 3 feet; solution channels in underlying bedrock in places.

properties of the soils—Continued

Soil features affecting—Continued				
Embankments and dikes	Drainage for crops and pasture	Irrigation	Terraces and diversions	Shallow excavations
Poor to fair stability; pervious material in places; flooding.	Seasonal high water table at or near the surface; variable permeability; flooding; a lack of outlets.	Seasonal high water table at or near the surface; variable permeability; flooding.	Flooding; seasonal high water table at or near the surface.	Seasonal high water table at or near surface; flooding.
Fair stability; stones on surface of GmC and GmF.	Well drained	Moderate available water capacity; rippable bedrock at a depth of 2 to 3 feet; stones on surface of GmC and GmF.	Rippable bedrock at a depth of 2 to 3 feet; stones on surface of GmC and GmF.	Rippable bedrock at a depth of 2 to 3 feet; stones on surface of GmC and GmF.
Fair stability; flooding	Well drained	No special problems	Flooding	Flooding.
Fair stability; stones on surface of LcE.	Well drained	Stones on surface of LbC, LbD, and LcE.	Stones on surface of LbC, LbD, and LcE.	Stones on surface of LbC, LbD, and LcE.
Pervious material	Well drained	Moderate available water capacity; moderately rapid permeability; bedrock at a depth of 2 to 3 feet.	Bedrock at a depth of 2 to 3 feet.	Bedrock at a depth of 2 to 3 feet.
Fair stability; flooding	Seasonal high water table at a depth of 1½ to 2 feet.	Seasonal high water table at a depth of 1½ to 2 feet; flooding.	Flooding; seasonal high water table at a depth of 1½ to 2 feet.	Seasonal high water table at a depth of 1¼ to 2 feet; flooding.
Pervious material; erodible.	Well drained	Very low available water capacity.	Bedrock at a depth of less than 1 foot; rock outcrops.	Bedrock at a depth of less than 1 foot; rock outcrops.
Poor stability; flooding; erodible.	Seasonal high water table at or near the surface; flooding.	Seasonal high water table at or near the surface; flooding.	Flooding; seasonal high water table at or near the surface.	Seasonal high water table at or near the surface; flooding.
Fair stability	Seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability; moderate available water capacity.	Seasonal high water table at a depth of 1½ to 2½ feet; seepage.	Seasonal high water table at a depth of 1½ to 2½ feet.
Fair stability; stones on surface of MsC, MsD, and MsE.	Well drained	Stones on surface of MsC, MsD, and MsE.	Stones on surface of MsC, MsD, and MsE.	Stones on surface of MsC, MsD, and MsE.
Fair stability	Well drained	Features generally favorable.	Features generally favorable.	Features generally favorable.

TABLE 7.—*Interpretations of engineering*

Soil series and map symbols	Suitability for winter grading	Potential frost action	Suitability as source of—		Soil features affecting—	
			Topsoil	Road fill	Highway location	Pond reservoir areas
Opequon-Rock outcrop complex: OpD, OpD3, OpF.	Poor	Moderate	Poor	Poor	Bedrock at a depth of 1 foot to 1½ feet; rock outcrops.	Bedrock at a depth of 1 foot to 1½ feet; rock outcrops.
Philo: Pf, Pg, Ph	Poor	Moderate	Good for Pf and Ph. Poor for Pg.	Fair	Seasonal high water table at a depth of 1½ to 2 feet; flooding.	Pervious material in substratum; flooding.
Pope: Pm, Po, Ps	Fair	Low to moderate	Good for Po and Ps. Poor for Pm.	Good	Flooding	Pervious material; flooding.
Purdy: Pu	Unsuitable	High	Fair to poor.	Poor	Seasonal high water table at or near the surface.	Low seepage losses
*Ramsey: RdD, RdF. For Dekalb part, see Dekalb series.	Good	Low	Poor	Poor	Bedrock at a depth of 1 foot to 1½ feet; stones.	Pervious material; bedrock at a depth of 1 foot to 1½ feet.
Rubble land: Rn. Too variable to be rated.						
Rushtown: RuD, RuF	Good	Low	Poor	Good	Stability of slopes	Pervious material
Schaffenaker: ShC, ShE, ShF.	Good	Low	Poor	Fair to good.	Bedrock at a depth of 2 to 3 feet; stones.	Pervious material; bedrock at a depth of 2 to 3 feet.
Strip mine: SM. Too variable to be rated.						
Tygart: Tg	Unsuitable	High	Fair	Poor	Seasonal high water table at a depth of ½ foot to 1½ feet.	Low seepage losses
Typic Dystrochrepts: TPC, TPE.	Poor to unsuitable.	Low	Poor	Poor	Bedrock at a depth of 2 to 3 feet; stones.	Pervious material in substratum; bedrock at a depth of 2 to 3 feet; stones.
Udifluvents and Fluvaquents: UF.	Fair to poor	Low	Poor	Good	Seasonal high water table at or near the surface in places; flooding.	Pervious material; seasonal high water table at or near the surface in places; flooding.
*Weikert: WeB3, WeC3, WeD3, WeE3, WeF3, WkB, WkC, WkD, WkE, WkF. For Berks part of WkB, WkC, WkD, WkE, and WkF, see Berks series.	Good	Low	Poor	Good	Rippable bedrock at a depth of 1 foot to 1½ feet.	Pervious substratum; rippable bedrock at a depth of 1 foot to 1½ feet.
Wharton: WnB, WnC, WoC	Poor	High	Good to fair.	Poor	Seasonal high water table at a depth of 1½ to 2 feet.	Low seepage losses

properties of the soils—Continued

Soil features affecting—Continued				
Embankments and dikes	Drainage for crops and pasture	Irrigation	Terraces and diversions	Shallow excavations
Poor stability	Well drained	Low to moderate available water capacity; bedrock at a depth of 1 foot to 1½ feet; rock outcrops.	Bedrock at a depth of 1 foot to 1½ feet; rock outcrops.	Bedrock at a depth of 1 foot to 1½ feet; rock outcrops.
Fair stability	Seasonal high water table at a depth of 1½ to 2 feet.	Seasonal high water table at a depth of 1½ to 2 feet; moderate to moderately slow permeability; flooding.	Flooding; seasonal high water table at a depth of 1½ to 2 feet.	Seasonal high water table at a depth of 1½ to 2 feet; flooding.
Pervious material; flooding.	Well drained	Moderate to moderately rapid permeability; flooding.	Flooding	Flooding.
Fair to poor stability; erodible.	Seasonal high water table at or near the surface; slow permeability.	Seasonal high water table at or near the surface; slow permeability.	Seasonal high water table at or near the surface.	Seasonal high water table at or near the surface.
Pervious material; stones.	Somewhat excessively drained.	Rapid permeability; stones.	Bedrock at a depth of 1 foot to 1½ feet; stones.	Bedrock at a depth of 1 to 1½ feet; stones.
Pervious material	Excessively drained	Rapid permeability	Features generally favorable.	Features generally favorable.
Pervious material	Well drained	Very rapid permeability; very low available water capacity; stones.	Bedrock at a depth of 2 to 3 feet; stones.	Bedrock at a depth of 2 to 3 feet; stones.
Fair stability; erodible	Seasonal high water table at a depth of ½ foot to 1½ feet; slow permeability.	Slow permeability	Seasonal high water table at a depth of ½ foot to 1½ feet.	Seasonal high water table at a depth of ½ foot to 1½ feet.
Pervious material; stones.	Well drained	Low to moderate available water capacity; moderately rapid permeability; stones.	Bedrock at a depth of 2 to 3 feet; stones.	Bedrock at a depth of 2 to 3 feet; stones.
Pervious materials	Seasonal high water table at or near the surface in places; flooding.	Low available water capacity; rapid permeability; seasonal high water table at or near the surface in places; flooding.	Flooding; seasonal high water table at or near the surface in places.	Seasonal high water table at or near the surface in places; flooding.
Fair stability	Well drained	Moderately rapid permeability; low available water capacity.	Rippable bedrock at a depth of 1 foot to 1½ feet.	Rippable bedrock at a depth of 1 foot to 1½ feet.
Fair stability; erodible	Seasonal high water table at a depth of 1½ to 2 feet; slow permeability.	Seasonal high water table at a depth of 1½ to 2 feet; slow permeability; stones on surface of WoC.	Stones on surface of WoC.	Seasonal high water table at a depth of 1½ to 2 feet; stones on surface of WoC.

TABLE 8.—*Engineering*

[Tests performed by the West Virginia University in cooperation with West Virginia State Road Commission and the Bureau Officials

Soil name and location	Parent material	Report No. S-64 W. Va.	Depth	Moisture-density[1]		Mechanical analysis[2]	
				Maximum dry density	Optimum moisture	Percentage passing sieve—	
						No. 4 (4.7 mm)	No. 10 (2.0 mm)
			Inches	*Lb per cu ft*	*Pct*		
Buchanan very stony loam: 1.8 miles N of State Route 9, W side of State Route 9/14, Morgan County (Modal).	Colluvium from acid sandstone, siltstone, and shale on uplands.	33–4–1	1–9	111	16	97	90
		33–4–2	14–26	117	20	96	94
		33–4–3	36–52	113	16	94	91
Calvin channery silt loam: 0.2 mile N of store at Three Churches, W Side of State Route 5, Hampshire County (Modal).	Residuum from red shale and fine-grained sandstone.	14–10–1	0–9	108	17	96	[4]91
		14–10–2	12–24	119	14	75	62
		14–10–3	24–29	124	12	72	60
Laidig very stony loam: 1.2 miles N of State Route 9, W side of State Route 9/14, Morgan County (Finer textured than modal).	Colluvium from acid gray sandstone, siltstone, and shale on uplands.	33–3–1	0–10	103	20	--	100
		33–3–2	15–28	124	9	95	88
		33–3–3	48–66	125	12	97	95
Lehew channery fine sandy loam: 200 yards SW of Slanesville Grade School, 150 feet W of State Route 45, Hampshire County (Finer textured than modal).	Residuum from acid red sandstone and some siltstone and shale.	14–8–1	1–6	102	18	96	95
		14–8–2	6–16	116	13	----	100
		14–8–3	16–26	117	14	----	100
Weikert shaly silt loam: 0.5 mile S of Springfield, 225 yards ESE of State Route 28, Hampshire County (Finer textured than modal).	Residuum from acid gray and brown shale, siltstone, and sandstone.	14–3–1	½–7	101	14	86	82
		14–3–2	7–12	113	15	89	82
		14–3–3	12–17	117	14	93	85

[1] Based on AASHTO Designation T 99–57, Methods A and C (*2*).

[2] Mechanical analyses according to the AASHTO Designation T 88–57 (*2*). Results by this procedure may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is ana-

Frost action is the heaving caused by ice lenses forming in the soil and the subsequent loss of strength as a result of excess moisture during thawing periods. Soils that have a high percentage of silt and very fine sand and can deliver water to a stationary or slowly moving freezing front are highly susceptible to frost action.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or its response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings is damage that will result at the area from which topsoil is taken.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

Soil properties that most affect highway and road location are load-supporting capacity and stability of the subgrade and the workability and quantity of cut-and-fill material available. The AASHTO and Unified classifications of the soil material, and also the shrink-swell potential, indicate traffic-supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

test data

of Public Roads in accordance with standard procedures of the American Association of State Highway and Transportation (AASHTO)]

Mechanical analysis[2]—Continued						Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued		Percentage smaller than—							
No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO [3]	Unified
						Pct			
77	52	45	30	15	9	20	7	A-4(3)	ML-CL
82	61	56	42	26	20	35	16	A-6(8)	CL
79	51	43	18	14	11	33	15	A-6(5)	CL
79	62	58	44	21	13	40	10	A-4(5)	ML
41	23	20	12	5	2	27	8	A-2-4(0)	SC
39	20	17	11	7	2	24	5	A-1-6(0)	SM-SC
94	72	63	42	16	10	26	7	A-4(7)	ML-CL
71	51	44	28	12	7	19	5	A-4(3)	ML-CL
85	55	46	27	10	6	20	8	A-4(4)	CL
90	66	59	40	16	7	28	5	A-4(6)	ML-CL
95	70	62	43	17	8	19	6	A-4(7)	ML-CL
91	58	50	30	13	8	21	6	A-4(5)	ML-CL
72	53	48	32	12	7	36	9	A-4(4)	ML
66	44	38	24	9	5	28	8	A-4(2)	SC
64	39	32	20	10	6	25	8	A-4(1)	SC

lyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for use in naming textural classes for soil.

[3] Based on AASHTO Designation M 145-49 (*2*).

[4] Fragments of soft shale larger than 2 millimeters in diameter often slake down or are crushed in laboratory procedure; therefore, a higher percentage of material passes No. 10 and larger sieves.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Embankments and dikes require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil is among the features that are unfavorable.

Drainage of cropland and pasture is affected by such soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope, stability in ditchbanks; susceptibility to stream overflow; salinity or alkalinity; and availability of outlets for drainage.

Irrigation of a soil is affected by such features as slope; susceptibility to stream overflow, water erosion, or soil blowing; soil texture; content of stones; accumulations of salts and alkali; depth of root zone; rate of water intake at the surface; permeability of soil layers below the surface layer and in fragipans or other layers that restrict movement of water; amount of water held available to plants; and need for drainage, or depth to water table or bedrock.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff and seepage so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a

soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff and is not difficult to vegetate.

Shallow excavations for pipelines, sewerlines, phone and power transmission lines, basements, open ditches, and cemeteries are those that generally require digging or trenching to a depth of less than 6 feet. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or big stones, and freedom from flooding or a high water table.

Engineering test data

Table 8 contains engineering test data for some of the major soil series in Hampshire, Mineral, and Morgan Counties. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Compaction (or moisture-density) data are important in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the *optimum moisture content* is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed *maximum dry density*. As a rule, maximum strength, for a given level of effort, is obtained if the soil is compacted to the maximum dry density.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. In table 8 the data on liquid limit and plasticity index are based on tests of soil samples.

Town and Country Planning

Town and country planning is becoming more extensive and more important in Hampshire, Mineral, and Morgan Counties. Sound planning is vital to the success of individual enterprises. It is perhaps even more important in community or countywide planning. Facts in this survey and interpretations of the soils in the counties provide information useful in such planning and establishment.

This section of the soil survey provides information on the properties of soils and their effect on selected nonfarm uses of land. It will help community planners, developers, and individual landowners to determine the most suitable use for a particular area. Other useful information can be found on the soil maps and in other parts of the survey, particularly the section "Descriptions of the Soils" and the subsection "Engineering Uses of the Soils."

Table 9 gives the estimated degree and kinds of limitations of soils for some selected uses. These limitations are rated slight, moderate, or severe. If the rating is moderate or severe, the main limiting property or properties are given. The ratings are based on the degree of the greatest single limitation. For example, if flooding severely limits the use of a soil in the disposal of sewage effluent from septic tanks, the limitation is rated severe, though the soil is well suited to that use in all other respects. A rating of *slight* indicates that the soil has no important limitation to the specific use. *Moderate* means that the soil has some limitations to the specified use. These limitations need to be recognized, but they can be overcome or corrected. A rating of *severe* indicates that the soil has serious limitations that are difficult to overcome. A severe rating, however, does not mean that the soil cannot be used for the specific use.

The information given is for the named soil to a depth of 4 or 5 feet, or to bedrock if less deep, and therefore does not apply to a greater depth or necessarily to other soils that may be included within a delineation on the detailed soil map. The rating of limitations in table 9 does not eliminate the need for careful onsite investigation.

The properties considered in rating the limitations of the soils for each of the uses given in table 9 are discussed in the following paragraphs.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material between depths of 18 inches and 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor, and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic-matter content, and slope, and if the floor needs to be leveled, depth to and condition of bedrock become important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified soil classification and the amounts of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Dwellings with basements are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load, and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Properties that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

The ratings for lawns and landscaping consider soil properties that affect the establishment of lawns and landscaping around dwellings. Soil properties should be such that with the additions of lime and fertilizer a good lawn can be easily established and maintained. Among the soil properties that determine whether a good lawn can be established are depth to bedrock, texture, slope, droughtiness, depth to water table, hazard of flooding, and the content of coarse fragments.

Local roads and streets have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that affect design and construction of roads and streets are load-supporting capacity and stability of the subgrade, and the workability and quantity of cut and fill material available. The AASHTO and Unified classifications of the soil material, and also the shrink-swell potential, indicate traffic-supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for these uses need to withstand foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry. If grading and leveling are required, depth to rock is important.

Camp areas are used intensively for tents and small camp trailers and the accompanying activities of outdoor living. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. Camp areas are subject to heavy foot traffic and limited vehicular traffic. The best soils have mild slopes, good drainage, a surface free of rocks and coarse fragments, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry.

Picnic areas are attractive natural or landscaped tracts used primarily for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The best soils are firm when wet but not dusty when dry; are free of flooding during the season of use; do not have slopes or stoniness that greatly increase cost of leveling sites or of building access roads.

Paths and trails are used for local and cross-country travel by foot or horseback. Design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, are firm when wet but not dusty when dry, are flooded not more than once during the season of use, have slopes of less than 15 percent, and have few or no rocks or stones on the surface.

Foramation, Morphology, and Classification of the Soils

In this section the major factors that affect the formation and morphology of the soils in Hampshire, Mineral, and Morgan Counties are discussed. In addition, classification of the soils by higher categories is explained.

Factors of Soil Formation

Soil is formed by the effects of climate and living matter acting upon parent material, as conditioned by relief, over a period of time. The relative influence of each of these factors commonly varies from place to place. Local variations in soils are based on differences in kinds of parent material and in topography and drainage. In places one factor can dominate the formation of a soil and determine most of its properties, but no factor is completely independent of the others.

Parent material

Hampshire, Mineral, and Morgan Counties formed in materials weathered from sedimentary rocks. Some of these materials weathered in place, some were transported by water, and some were moved by gravitational forces. About 79 percent of the soils formed in materials weathered in place (upland soils); 9 percent formed in materials transported by water (terrace and flood-plain soils); and 12 percent formed in materials that were moved downslope by gravity and water (colluvial soils).

The characteristics of the soils in the survey area are largely determined by the nature of the parent material. The texture; mineralogy; natural fertility; and, to a lesser extent, the drainage and depth are related to the parent material. The nature of the parent material is in turn related to the underlying rock from which it weathered.

Most rock strata underlying the survey area are acid. Some are coarse-grained, gray and brown sandstone, similar to those in which the soils of the Schaffenaker series formed. The Dekalb and Ramsey soils formed in materials weathered from more impure gray and brown sandstone. The Dekalb soils also have some interbedded gray and grown shale and siltstone. The Lehew soils formed in materials weathered mainly from red sandstone with some influence from red siltstone and shale. These are all upland soils that formed in place.

TABLE 9.—*Estimated degree and kind of*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. carefully the instructions for referring to other

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Dwellings with basements	Lawns and landscaping
Albrights:				
AbB	Severe: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Severe: seasonal high water table at a depth of 1½ to 2½ feet.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet.
AbC	Severe: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Severe: seasonal high water table at a depth of 1½ to 2½ feet; slope.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope.
Allegheny:				
AfB, AgB	Slight	Severe: pervious substratum.	Slight	Slight
AgC	Moderate: slope	Severe: pervious substratum; slope.	Moderate: slope	Moderate: slope
*Andover: ArB For Brinkerton part, see Brinkerton series.	Severe: seasonal high water table at or near the surface; slow permeability.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.
Atkins: At, Ay	Severe: seasonal high water table at or near the surface; flooding; moderately slow permeability.	Severe: seasonal high water table at or near the surface; flooding; pervious substratum.	Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface; flooding.
Berks:				
BcB, BkB	Severe: rippable bedrock at a depth of 2 to 3 feet.	Severe: rippable bedrock at a depth of 2 to 3 feet; pervious substratum; slope.	Moderate: rippable bedrock at a depth of 2 to 3 feet.	Moderate: rippable bedrock at a depth of 2 to 3 feet; coarse fragments on surface.
BcC, BcC3, BkC, BkC3.	Severe: rippable bedrock at a depth of 2 to 3 feet.	Severe: rippable bedrock at a depth of 2 to 3 feet; pervious substratum; slope.	Moderate: rippable bedrock at a depth of 2 to 3 feet; slope.	Moderate: rippable bedrock at a depth of 2 to 3 feet; coarse fragments on surface; slope.
BcD, BcD3, BkD, BkD3.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Severe: rippable bedrock at a depth of 2 to 3 feet; pervious substratum; slope.	Severe: slope	Severe: slope
BcE, BcE3, BcF, BkE3, BkF.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Severe: rippable bedrock at a depth of 2 to 3 feet; pervious substratum; slope.	Severe: slope	Severe: slope
Braddock:				
BrB	Slight	Moderate: previous substratum; coarse fragments on surface.	Slight	Moderate: coarse fragments on surface.
BrC	Moderate: slope	Severe: slope	Moderate: slope	Moderate: coarse fragments on surface; slope.
Brinkerton: BsB	Severe: seasonal high water table at or near the surface; slow permeability.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.

limitations for town and country planning

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow series that appear in the first column of this table]

Local roads and streets	Playgrounds	Camp areas	Picnic areas	Paths and trails
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability; slope.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Slight	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action; slope.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability; slope.	Moderate: slope	Slight.
Slight	Moderate: slope	Slight	Slight	Slight.
Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope	Slight.
Severe: seasonal high water table at or near the surface; high susceptibility to frost action.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.
Severe: seasonal high water table at or near the surface; high susceptibility to frost action; flooding.	Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.
Moderate: rippable bedrock at a depth of 2 to 3 feet; moderate susceptibility to frost action.	Severe: coarse fragments on surface.	Slight	Slight	Slight.
Moderate: rippable bedrock at a depth of 2 to 3 feet; moderate susceptibility to frost action; slope.	Severe: coarse fragments on surface; slope.	Moderate: slope	Moderate: slope	Slight.
Severe: slope	Severe: coarse fragments on surface; slope.	Severe: slope	Severe: slope	Moderate: slope.
Severe: slope	Severe: coarse fragments on surface; slope.	Severe: slope	Severe: slope	Severe: slope.
Slight	Severe: coarse fragments on surface.	Slight	Slight	Slight.
Moderate: slope	Severe: slope; coarse fragments on surface.	Moderate: slope	Moderate: slope	Slight.
Severe: seasonal high water table at or near the surface; high susceptibility to frost action.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.

TABLE 9.—*Estimated degree and kind of limitations*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Dwellings with basements	Lawns and landscaping
Buchanan:				
BuB	Severe: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability.	Moderate: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; coarse fragments.
BuC	Severe: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; coarse fragments on surface slope.
BvC	Severe: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope; very stony surface layer.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; coarse fragments on surface; slope; very stony surface layer.
BvD	Severe: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability; slope.	Severe: slope	Severe: slope	Severe: slope
Calvin:				
CaD	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope; pervious substratum.	Severe: slope	Severe: slope
CbC	Severe: rippable bedrock at a depth of 2 to 3 feet; slope where greater than 15 percent.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope; pervious substratum.	Moderate: rippable bedrock at a depth of 2 to 3 feet; slope. Severe where slope is more than 15 percent.	Moderate: rippable bedrock at a depth of 2 to 3 feet; coarse fragments; slope. Severe where slope is more than 15 percent.
CcF	Severe: rippable bedrock at a depth of 2 to 3 feet; slope; extremely stony surface layer.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope; pervious substratum.	Severe: slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.
Chagrin: Cg	Severe: flooding	Severe: flooding; pervious substratum.	Severe: flooding	Moderate: flooding
Clarksburg:				
CkB	Severe: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability.	Moderate: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate shrink-swell potential.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; coarse fragments.
CkC	Severe: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate shrink-swell potential; slope.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; coarse fragments on surface; slope.
ClC	Severe: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate shrink-swell potential; slope; very stony surface layer.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; coarse fragments on surface; slope; very stony surface layer.

for town and country planning—Continued

Local roads and streets	Playgrounds	Camp areas	Picnic areas	Paths and trails
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; coarse fragments; slope; slow permeability.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability.	Slight	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action; slope.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability; slope.	Moderate: slope	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action; slope.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability; slope; very stony surface layer.	Moderate: slope	Moderate: very stony surface layer.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: stones; slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Moderate: rippable bedrock at a depth of 2 to 3 feet; slope. Severe where slope is more than 15 percent.	Severe: slope; coarse fragments on surface.	Moderate: slope. Severe where slope is more than 15 percent.	Moderate: slope. Severe where slope is more than 15 percent.	Slight. Moderate where slope is more than 15 percent.
Severe: slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.	Severe: slope	Severe: slope; extremely stony surface layer.
Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action; moderate shrink-swell potential.	Severe: coarse fragments on surface.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet.	Slight	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action; slope; moderate shrink-swell potential.	Severe: slope; coarse fragments on surface.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope.	Moderate: slope	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action; slope; moderate shrink-swell potential.	Severe: slope; coarse fragments on surface.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope; very stony surface layer.	Moderate: slope	Moderate: very stony surface layer.

TABLE 9.—*Estimated degree and kind of limitations*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Dwellings with basements	Lawns and landscaping
CID	Severe: seasonal high water table at a depth of 1½ to 2½ feet; slow permeability; slope.	Severe: slope	Severe: slope	Severe: slope
*Dekalb: DIC	Severe: bedrock at a depth of 2 to 3 feet.	Severe: bedrock at a depth of 2 to 3 feet; slope; pervious material and substratum.	Severe: bedrock at a depth of 2 to 3 feet.	Moderate: bedrock at a depth of 2 to 3 feet; very stony surface layer; slope.
DIE, DIF For Lehew part of DIC, DIE, and DIF, see Lehew series.	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: bedrock at a depth of 2 to 3 feet; slope; pervious material and substratum.	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope
Dunning: Du	Severe: seasonal high water table at or near the surface; slow permeability; flooding.	Severe: flooding	Severe: seasonal high water table at or near the surface; flooding; moderate to high shrink-swell potential.	Severe: seasonal high water table at or near the surface; flooding.
Edom: EaC	Moderate: bedrock below a depth of 3½ feet; slope.	Severe: slope	Moderate: bedrock below a depth of 3½ feet; slope; moderate to high shrink-swell potential.	Moderate: slope
EaD	Severe: slope	Severe: slope	Severe: slope	Severe: slope
EaE, EbF3	Severe: slope	Severe: slope	Severe: slope	Severe: slope
EbC3	Moderate: bedrock below a depth of 3½ feet; slope.	Severe: slope	Moderate: bedrock below a depth of 3½ feet; slope; moderate to high shrink-swell potential.	Moderate: slope; moderately fine surface layer.
EbD3	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Edom variant: EcC	Severe: bedrock at a depth of 1½ feet to 3 feet.	Severe: bedrock at a depth of 1½ to 3 feet: slope.	Severe: bedrock at a depth of 1½ to 3 feet; slope; moderate to high shrink-swell potential.	Moderate: bedrock at a depth of 1½ to 3 feet; slope.
EcD	Severe: bedrock at a depth of 1½ to 3 feet; slope.	Severe: bedrock at a depth of 1½ to 3 feet; slope.	Severe: slope	Severe: slope
EcE	Severe: bedrock at a depth of 1½ to 3 feet; slope.	Severe: bedrock at a depth of 1½ to 3 feet; slope.	Severe: slope	Severe: slope
EdC3	Severe: bedrock at a depth of 1½ to 3 feet.	Severe: bedrock at a depth of 1½ to 3 feet; slope.	Severe: bedrock at a depth of 1½ to 3 feet; slope; moderate to high shrink-swell potential.	Moderate: bedrock at a depth of 1½ to 3 feet; slope; moderately fine surface layer.
EdD3	Severe: bedrock at a depth of 1½ to 3 feet; slope.	Severe: bedrock at a depth of 1½ to 3 feet; slope.	Severe: slope	Severe: slope

for town and country planning—Continued

Local roads and streets	Playgrounds	Camp areas	Picnic areas	Paths and trails
Severe: slope	Severe: slope; coarse fragments on surface.	Severe: slope	Severe: slope	Moderate: very stony surface layer; slope.
Moderate: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope; coarse fragments on surface.	Moderate: slope; very stony surface layer.	Moderate: slope	Moderate: very stony surface layer.
Severe: slope	Severe: slope; coarse fragments on surface.	Severe: slope	Severe: slope	Severe: slope. Moderate where slope is less than 25 percent.
Severe: seasonal high water table at or near the surface; high susceptibility to frost action; flooding.	Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.
Moderate: moderate to high shrink-swell potential; slope; moderate susceptibility to frost action.	Severe: slope	Moderate: slope	Moderate: slope	Slight.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Moderate: moderate to high shrink-swell potential; slope; moderate susceptibility to frost action.	Severe: slope	Moderate: slope; moderately fine surface layer.	Moderate: slope; moderately fine surface layer.	Moderate: moderately fine surface layer.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope; moderately fine surface layer.
Moderate: bedrock at a depth of 1½ to 3 feet; moderate to high shrink-swell potential; slope; moderate susceptibility to frost action.	Severe: slope	Moderate: slope	Moderate: slope	Slight.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Moderate: bedrock at a depth of 1½ to 3 feet; moderate to high shrink-swell potential; slope; moderate susceptibility to frost action.	Severe: slope	Moderate: slope; moderately fine surface layer.	Moderate: slope; moderately fine surface layer.	Moderate: moderately fine surface layer.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope; moderately fine surface layer.

TABLE 9.—*Estimated degree and kind of limitations*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Dwellings with basements	Lawns and landscaping
Elliber:				
EIC	Moderate: [1] slope	Severe: slope; coarse fragments throughout; pervious material and substratum.	Moderate: slope	Severe: coarse fragments throughout.
EID, EmE	Severe: [1] slope	Severe: slope; coarse fragments throughout; pervious materials and substratum.	Severe: slope	Severe: slope; coarse fragments throughout.
EIE, EmF	Severe: [1] slope	Severe: slope; coarse fragments throughout; pervious material and substratum.	Severe: slope	Severe: slope; coarse fragments throughout.
Ernest:				
ErB	Severe: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Moderate: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate shrink-swell potential.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet.
ErC	Severe: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate shrink-swell potential; slope.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope.
Es	Severe: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Moderate: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate shrink-swell potential; very stony surface layer.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; very stony surface layer.
Fluvaquents: FA	Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface; flooding; pervious layers in substratum.	Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface; flooding.
Gilpin:				
GIB	Severe: rippable bedrock at a depth of 2 to 3 feet.	Severe: rippable bedrock at a depth of 2 to 3 feet.	Moderate: rippable bedrock at a depth of 2 to 3 feet; moderate shrink-swell potential.	Moderate: rippable bedrock at a depth of 2 to 3 feet.
GIC	Severe: rippable bedrock at a depth of 2 to 3 feet.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Moderate: rippable bedrock at a depth of 2 to 3 feet; slope; moderate shrink-swell potential.	Moderate: rippable bedrock at a depth of 2 to 3 feet; slope.
GID	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Severe: slope	Severe: slope
GIE	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Severe: slope	Severe: slope

for town and country planning—Continued

Local roads and streets	Playgrounds	Camp areas	Picnic areas	Paths and trails
Moderate: slope	Severe: slope; coarse fragments throughout.	Severe: coarse fragments throughout.	Severe: coarse fragments throughout.	Severe: coarse fragments throughout.
Severe: slope	Severe: slope; coarse fragments throughout.	Severe: coarse fragments throughout; slope.	Severe: coarse fragments throughout; slope.	Severe: coarse fragments throughout; slope where greater than 25 percent.
Severe: slope	Severe: slope; coarse fragments throughout.	Severe: coarse fragments throughout; slope.	Severe: coarse fragments throughout; slope.	Severe: coarse fragments throughout; slope.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action; moderate shrink-swell potential.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope; moderately slow permeability.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Slight	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope; moderate susceptibility to frost action; moderate shrink-swell potential.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability; slope.	Moderate: slope	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate susceptibility to frost action; moderate shrink-swell potential.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope; moderately slow permeability; very stony surface layer.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability; very stony surface layer.	Slight	Moderate: very stony surface layer.
Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface; flooding.	Severe: seasonal high water table at or near the surface; flooding.	Moderate: seasonal high water table at or near the surface; flooding.
Moderate: moderate susceptibility to frost action; moderate shrink-swell potential.	Moderate: rippable bedrock at a depth of 2 to 3 feet; slope.	Slight	Slight	Slight.
Moderate: slope; moderate susceptibility to frost action; moderate shrink-swell potential.	Severe: slope	Moderate: slope	Moderate: slope	Slight.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.

TABLE 9.—*Estimated degree and kind of limitations*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Dwellings with basements	Lawns and landscaping
GmC	Severe: rippable bedrock at a depth of 2 to 3 feet; slope; extremely stony surface layer.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Severe: extremely stony surface layer.	Severe: extremely stony surface layer.
GmF	Severe: rippable bedrock at a depth of 2 to 3 feet; slope; extremely stony surface layer.	Severe: rippable bedrock at a depth of 2 to 3 feet; slope.	Severe: slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.
Huntington: Hu	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Laidig:				
LaB	Severe: moderately slow permeability.	Moderate: slope; coarse fragments throughout.	Moderate: seasonal high water table below a depth of 3 feet.	Moderate: coarse fragments throughout.
LaC	Severe: moderately slow permeability.	Severe: slope	Moderate: seasonal high water table below a depth of 3 feet; slope.	Moderate: coarse fragments throughout; slope.
LaD	Severe: moderately slow permeability; slope.	Severe: slope	Severe: slope	Severe: slope
LbC	Severe: moderately slow permeability.	Severe: slope	Moderate: seasonal high water table below a depth of 3 feet; slope; very stony surface layer.	Moderate: coarse fragments throughout; slope; very stony surface layer.
LbD	Severe: moderately slow permeability; slope.	Severe: slope	Severe: slope	Severe: slope
LcE	Severe: moderately slow permeability; slope; extremely stony surface layer.	Severe: slope	Severe: slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.
*Lehew:				
LeB, LeB3, LkB, LkB3. For Berks part of LkB and LkB3, see Berks series.	Severe: bedrock at a depth of 2 to 3 feet.	Severe: bedrock at a depth of 2 to 3 feet; pervious material.	Severe: bedrock at a depth of 2 to 3 feet.	Moderate: bedrock at a depth of 2 to 3 feet; coarse fragments throughout.
LeC, LeC3, LkC, LkC3, LlC. For Berks part of LkC and LkC3, see Berks series. For Dekalb part of LlC, see Dekalb series.	Severe: bedrock at a depth of 2 to 3 feet.	Severe: bedrock at a depth of 2 to 3 feet; slope; pervious material.	Severe: bedrock at a depth of 2 to 3 feet.	Moderate: bedrock at a depth of 2 to 3 feet; coarse fragments throughout; slope.
LeD, LeD3, LeE, LeF, LkD, LkD3, LlD. For Berks part of LkD and LkD3, see Berks series. For Dekalb part of LlD, see Dekalb series.	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: bedrock at a depth of 2 to 3 feet; slope; pervious material.	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope

for town and country planning—Continued

Local roads and streets	Playgrounds	Camp areas	Picnic areas	Paths and trails
Moderate: slope; moderate shrink-swell potential; moderate susceptibility to frost action; extremely stony surface layer.	Severe: slope; extremely stony surface layer.	Severe: extremely stony surface layer.	Moderate: slope; extremely stony surface layer.	Severe: extremely stony surface layer.
Severe: slope	Severe: slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.	Severe: slope	Severe: slope; extremely stony surface layer.
Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Slight.
Slight	Severe: coarse fragments throughout.	Slight	Slight	Slight.
Moderate: slope	Severe: coarse fragments throughout; slope.	Moderate: slope	Moderate: slope	Slight.
Severe: slope	Severe: coarse fragments throughout; slope.	Severe: slope	Severe: slope	Moderate: slope.
Moderate: slope	Severe: coarse fragments throughout; slope.	Moderate: slope; very stony surface layer.	Moderate: slope	Moderate: very stony surface layer.
Severe: slope	Severe: coarse fragments throughout; slope.	Severe: slope	Severe: slope	Moderate: slope; very stony surface layer.
Severe: slope	Severe: coarse fragments throughout slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.
Moderate: bedrock at a depth of 2 to 3 feet.	Severe: coarse fragments throughout.	Slight	Slight	Slight.
Moderate: bedrock at a depth of 2 to 3 feet; slope.	Severe: coarse fragments throughout; slope.	Moderate: slope	Moderate: slope	Slight.
Severe: slope	Severe: coarse fragments throughout; slope.	Severe: slope	Severe: slope	Moderate: slope.

TABLE 9.—*Estimated degree and kind of limitations*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Dwellings with basements	Lawns and landscaping
LkE, LkF, LIE, LIF. For Berks part of LkE and LkF, see Berks series. For Dekalb part of LIE and LIF, see Dekalb series.	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: bedrock at a depth of 2 to 3 feet; slope; pervious material.	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope
Lindside: Ln	Severe: flooding; seasonal high water table at a depth of 1½ to 2 feet.	Severe: flooding; seasonal high water table at a depth of 1½ to 2 feet; pervious substratum.	Severe: flooding; seasonal high water table at a depth of 1½ to 2 feet.	Moderate: flooding
*Lithic Udorthents-Rock outcrop complex: LR. Rock outcrop part too variable for interpretations to be made.	Severe: bedrock above a depth of 1 foot; rock outcrops; slope.	Severe: bedrock above a depth of 1 foot; rock outcrops; slope.	Severe: bedrock above a depth of 1 foot; rock outcrops; slope.	Severe: bedrock above a depth of 1 foot; rock outcrops; slope.
Melvin: Me	Severe: flooding; seasonal high water table at or near the surface; moderately slow permeability.	Severe: flooding; seasonal high water table at or near the surface.	Severe: flooding; seasonal high water table at or near the surface.	Severe: flooding; seasonal high water table at or near the surface.
Monongahela:				
MhA	Severe: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Slight	Moderate: seasonal high water table at a depth of 1½ to 2½ feet.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet.
MhB	Severe: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Moderate: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet.
MhC, MhC3	Severe: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; slope.
Murrill:				
MIB	Slight	Moderate: moderate permeability; sinks and solution channels in places; slope.	Slight	Moderate: coarse fragments on surface.
MIC	Moderate: slope	Severe: slope	Moderate: slope	Moderate: coarse fragments on surface; slope.
MID	Severe: slope	Severe: slope	Severe: slope	Severe: slope
MsC	Moderate: slope; very stony surface layer.	Severe: slope	Moderate: slope; very stony surface layer.	Moderate: slope; very stony surface layer.
MsD	Severe: slope	Severe: slope	Severe: slope	Severe: slope

for town and country planning—Continued

Local roads and streets	Playgrounds	Camp areas	Picnic areas	Paths and trails
Severe: slope	Severe: coarse fragments throughout; slope.	Severe: slope	Severe: slope	Severe: slope.
Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding	Slight.
Severe: bedrock above a depth of 1 foot; rock outcrops; slope.	Severe: bedrock above a depth of 1 foot; rock outcrops; slope.	Severe: rock outcrops; slope.	Severe: rock outcrops; slope.	Severe: rock outcrops; slope.
Severe: flooding; seasonal high water table at or near the surface; high susceptibility to frost action.	Severe: flooding; seasonal high water table at or near the surface.	Severe: flooding; seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate to high susceptibility to frost action.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Slight	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate to high susceptibility to frost action.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability; slope.	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability.	Slight	Slight.
Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderate to high susceptibility to frost action; slope.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2½ feet; moderately slow permeability; slope.	Moderate: slope	Slight.
Slight	Moderate: coarse fragments on surface; slope.	Slight	Slight	Slight.
Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope	Slight.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Moderate: slope	Severe: slope	Moderate: slope; very stony surface layer.	Moderate: slope	Moderate: very stony surface layer.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope; very stony surface layer.

TABLE 9.—*Estimated degree and kind of limitations*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Dwellings with basements	Lawns and landscaping
MsE	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Murrill variant:				
MvB	Slight	Moderate: moderate permeability; sinks and solution channels in places; slope.	Moderate: moderate shrink-swell potential below a depth of 1½ to 3 feet.	Moderate: coarse fragments on surface.
MvC	Moderate: slope	Severe: slope	Moderate: slope; moderate shrink-swell potential below a depth of 1½ to 3 feet.	Moderate: coarse fragments on surface; slope.
MvD	Severe: slope	Severe: slope	Severe: slope	Severe: slope
*Opequon-Rock outcrop complex:				
OpD	Severe: bedrock at a depth of 1 to 1½ feet; slope; moderately slow permeability; very rocky surface.	Severe: bedrock at a depth of 1 to 1½ feet; slope.	Severe: bedrock at a depth of 1 to 1½ feet; slope where greater than 15 percent; very rocky surface; high shrink-swell potential.	Severe: bedrock at a depth of 1 to 1½ feet; very rocky surface; slope.
OpD3	Severe: bedrock at a depth of 1 to 1½ feet; slope; moderately slow permeability; very rocky surface.	Severe: bedrock at a depth of 1 to 1½ feet; slope.	Severe: bedrock at a depth of 1 to 1½ feet; slope where greater than 15 percent; very rocky surface; high shrink-swell potential.	Severe: bedrock at a depth of 1 to 1½ feet; very rocky surface; slope.
OpF Rock outcrops part of OpD, OpD3, and OpF are too variable for interpretations to be made.	Severe: bedrock at a depth of 1 to 1½ feet; slope; moderately slow permeability; very rocky surface.	Severe: bedrock at a depth of 1 to 1½ feet; slope.	Severe: bedrock at a depth of 1 to 1½ feet; slope where greater than 15 percent; very rocky surface; high shrink-swell potential.	Severe: bedrock at a depth of 1 to 1½ feet; very rocky surface; slope.
Philo:				
Pf, Ph	Severe: flooding; seasonal high water table at a depth of 1½ to 2 feet.	Severe: flooding; pervious substratum.	Severe: flooding; seasonal high water table at a depth of 1½ to 2 feet.	Moderate: flooding; seasonal high water table at a depth of 1½ to 2 feet.
Pg	Severe: flooding; seasonal high water table at a depth of 1½ to 2 feet.	Severe: flooding; pervious substratum.	Severe: flooding; seasonal high water table at a depth of 1½ to 2 feet.	Moderate: flooding; seasonal high water table at a depth of 1½ to 2 feet; coarse fragments on surface.
Pope:				
Pm	Severe: [1] flooding	Severe: flooding; pervious material and substratum.	Severe: flooding	Moderate: flooding; coarse fragments on surface.
Po, Ps	Severe: [1] flooding	Severe: flooding; pervious material and substratum.	Severe: flooding	Moderate: flooding
Purdy: Pu	Severe: seasonal high water table at or near the surface; slow permeability.	Slight	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.
*Ramsey:				
RdD	Severe: [1] bedrock at a depth of 1 to 1½ feet; slope where greater than 15 percent; stony surface layer.	Severe: [1] bedrock at a depth of 1 to 1½ feet; slope; rapid permeability.	Severe: bedrock at a depth of 1 to 1½ feet; slope where greater than 15 percent; extremely stony surface layer.	Severe: bedrock at a depth of 1 to 1½ feet; slope; extremely stony surface layer.

for town and country planning—Continued

Local roads and streets	Playgrounds	Camp areas	Picnic areas	Paths and trails
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Moderate: moderate shrink-swell potential below a depth of 1½ to 3 feet.	Moderate: coarse fragments on surface; slope.	Slight	Slight	Slight.
Moderate: moderate shrink-swell potential below a depth of 1½ to 3 feet.	Severe: slope	Moderate: slope	Moderate: slope	Slight.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Severe: bedrock at a depth of 1 to 1½ feet; very rocky surface; high shrink-swell potential; slope where greater than 15 percent.	Severe: bedrock at a depth of 1 to 1½ feet; very rocky surface; slope.	Severe: slope. Moderate where slope is less than 15 percent.	Severe: slope. Moderate where slope is less than 15 percent.	Moderate: slope; silty clay loam surface layer; very rocky surface.
Severe: bedrock at a depth of 1 to 1½ feet; very rocky surface; high shrink-swell potential; slope where greater than 15 percent.	Severe: bedrock at a depth of 1 to 1½ feet; very rocky surface; slope; silty clay surface layer.	Severe: slope; silty clay surface layer.	Severe: slope; silty clay surface layer.	Severe: silty clay surface layer.
Severe: bedrock at a depth of 1 to 1½ feet; very rocky surface; high shrink-swell potential; slope where greater than 15 percent.	Severe: bedrock at a depth of 1 to 1½ feet; very rocky surface; slope.	Severe: slope	Severe: slope	Severe: slope.
Severe: flooding	Moderate: flooding; seasonal high water table at a depth of 1½ to 2 feet.	Severe: flooding	Moderate: flooding	Slight.
Severe: flooding	Severe: coarse fragments on surface.	Severe: flooding	Moderate: flooding	Slight.
Severe: flooding	Moderate: flooding; coarse fragments on surface.	Severe: flooding	Moderate: flooding	Slight.
Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Slight.
Severe: seasonal high water table at or near the surface; high susceptibility to frost action.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.	Severe: seasonal high water table at or near the surface.
Severe: bedrock at a depth of 1 to 1½ feet; slope where greater than 15 percent.	Severe: bedrock at a depth of 1 to 1½ feet; slope; extremely stony surface layer.	Severe: slope where greater than 15 percent; extremely stony surface layer.	Severe: slope where greater than 15 percent.	Severe: extremely stony surface layer.

TABLE 9.—*Estimated degree and kind of limitations*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Dwellings with basements	Lawns and landscaping
RdF — For Dekalb part of RdD and RdF, see Dekalb series.	Severe: [1] bedrock at a depth of 1 to 1½ feet; slope where greater than 15 percent; extremely stony surface layer.	Severe: [1] bedrock at a depth of 1 to 1½ feet; slope; rapid permeability.	Severe: bedrock at a depth of 1 to 1½ feet; slope where greater than 15 percent; extremely stony surface layer.	Severe: bedrock at a depth of 1 to 1½ feet; slope; extremely stony surface layer.
Rubble land: Rn. Properties too variable for interpretations to be made.				
Rushtown:				
RuD	Severe: slope where greater than 15 percent.	Severe: slope; pervious material.	Severe: slope where greater than 15 percent.	Severe: slope; coarse fragments throughout.
RuF	Severe: slope	Severe: slope; pervious material.	Severe: slope	Severe: slope; coarse fragments throughout.
Schaffenaker:				
ShC	Severe: bedrock at a depth of 2 to 3 feet.	Severe: bedrock at a depth of 2 to 3 feet; slope; pervious material.	Severe: bedrock at a depth of 2 to 3 feet.	Moderate: bedrock at a depth of 2 to 3 feet; very stony surface layer.
ShE	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: bedrock at a depth of 2 to 3 feet; slope; pervious material.	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope
ShF	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: bedrock at a depth of 2 to 3 feet; slope; pervious material.	Severe: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope
Strip mine: SM. Properties too variable for interpretations to be made.				
Tygart: Tg	Severe: seasonal high water table at a depth of ½ to 1½ feet; slow permeability.	Slight	Severe: seasonal high water table at a depth of ½ to 1½ feet.	Severe: seasonal high water table at a depth of ½ to 1½ feet.
Typic Dystrochrepts:				
TPC	Severe: bedrock at a depth of 2 to 3 feet; stony surface layer.	Severe: bedrock at a depth of 2 to 3 feet; stony surface layer; slope.	Severe: bedrock at a depth of 2 to 3 feet; stony surface layer.	Severe: stony surface layer; slope.
TPE	Severe: bedrock at a depth of 2 to 3 feet; stony surface layer; slope.	Severe: bedrock at a depth of 2 to 3 feet; stony surface layer; slope.	Severe: bedrock at a depth of 2 to 3 feet; stony surface layer; slope.	Severe: stony surface layer; slope.
Udifluvents and Fluvaquents:				
UF	Severe: flooding; seasonal high water table at or near the surface in places.	Severe: flooding; pervious material and substratum.	Severe: flooding; seasonal high water table at or near the surface in places.	Severe: flooding; seasonal high water table at or near the surface in places; droughty in places; coarse fragments on surface.

for town and country planning—Continued

Local roads and streets	Playgrounds	Camp areas	Picnic areas	Paths and trails
Severe: bedrock at a depth of 1 to 1½ feet; slope.	Severe: bedrock at a depth of 1 to 1½ feet; slope; extremely stony surface layer.	Severe: slope; extremely stony surface layer.	Severe: slope	Severe: slope; extremely stony surface layer.
Severe: slope where greater than 15 percent.	Severe: slope; coarse fragments throughout.	Severe: slope where greater than 15 percent.	Severe: slope where greater than 15 percent.	Moderate: slope.
Severe: slope	Severe: slope; coarse fragments throughout.	Severe: slope	Severe: slope	Severe: slope.
Moderate: bedrock at a depth of 2 to 3 feet; slope.	Severe: slope	Moderate: slope; very stony surface layer.	Moderate: slope	Moderate: very stony surface layer.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope. Moderate where slope is less than 25 percent.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: seasonal high water table at a depth of ½ to 1½ feet; high susceptibility to frost action.	Severe: seasonal high water table at a depth of ½ to 1½ feet.	Severe: seasonal high water table at a depth of ½ to 1½ feet.	Severe: seasonal high water table at a depth of ½ to 1½ feet.	Severe: seasonal high water table at a depth of ½ to 1½ feet.
Severe: stony surface layer.	Severe: slope; stony surface layer.	Severe: stony surface layer.	Severe: stony surface layer.	Severe: stony surface layer.
Severe: stony surface layer; slope.	Severe: slope; stony surface layer.	Severe: stony surface layer; slope.	Severe: stony surface layer; slope.	Severe: stony surface layer; slope where greater than 25 percent.
Severe: flooding; seasonal high water table at or near the surface in places.	Severe: flooding; seasonal high water table at or near the surface in places; droughty in places; coarse fragments on surface.	Severe: flooding	Severe: flooding	Moderate: flooding.

TABLE 9.—*Estimated degree and kind of limitations*

Soil series and map symbols	Septic tank absorption fields	Sewage lagoons	Dwellings with basements	Lawns and landscaping
*Weikert:				
WeB3, WkB — For Berks part of WkB, see Berks series.	Severe: rippable bedrock at a depth of 1 to 1½ feet.	Severe: rippable bedrock at a depth of 1 to 1½ feet.	Moderate: rippable bedrock at a depth of 1 to 1½ feet.	Moderate: rippable bedrock at a depth of 1 to 1½ feet; coarse fragments on surface; droughty.
WeC3, WkC — For Berks part of WkC, see Berks series.	Severe: rippable bedrock at a depth of 1 to 1½ feet.	Severe: rippable bedrock at a depth of 1 to 1½ feet; slope.	Moderate: rippable bedrock at a depth of 1 to 1½ feet; slope.	Moderate: rippable bedrock at a depth of 1 to 1½ feet; coarse fragments on surface; droughty; slope.
WeD3, WkD — For Berks part of WkD, see Berks series.	Severe: rippable bedrock at a depth of 1 to 1½ feet; slope.	Severe: rippable bedrock at a depth of 1 to 1½ feet; slope.	Severe: slope	Severe: slope
WeE3, WeF3, WkE, WkF. For Berks part of WkE and WkF, see Berks series.	Severe: rippable bedrock at a depth of 1 to 1½ feet; slope.	Severe: rippable bedrock at a depth of 1 to 1½ feet; slope.	Severe: slope	Severe: slope
Wharton:				
WnB	Severe: seasonal high water table at a depth of 1½ to 2 feet; slow permeability.	Moderate: slope; bedrock at a depth of 3½ to 6 feet.	Moderate: seasonal high water table at a depth of 1½ to 2 feet; moderate to high shrink-swell potential.	Moderate: seasonal high water table at a depth of 1½ to 2 feet.
WnC	Severe: seasonal high water table at a depth of 1½ to 2 feet; slow permeability.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2 feet; moderate to high shrink-swell potential; slope.	Moderate: seasonal high water table at a depth of 1½ to 2 feet; slope.
WoC	Severe: seasonal high water table at a depth of 1½ to 2 feet; slow permeability.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2 feet; moderate to high shrink-swell potential; slope; very stony surface layer.	Moderate: seasonal high water table at a depth of 1½ to 2 feet; slope; very stony surface layer.

[1] Ground water contamination is a problem in places.

The soils that formed in materials weathered mainly from gray and brown siltstone and shale constitute the largest acreage in the survey area. Examples are soils in the Weikert and Berks series in the Ridge and Valley region and soils in the Gilpin and Wharton series in the Allegheny Plateau region. These strata have some gray and brown sandstone interbedded with them. Most of the Weikert and Berks soils are in the low-rainfall section of Hampshire and Mineral Counties, known as the shale barrens.

Less than 3 percent of the soils in the survey area formed in place, in materials weathered from limestone and limey shale strata. The Opequon soils are from relatively pure limestone materials; the Edom soils formed in limey shale materials.

Of the soils transported by water, the soils on river terraces formed in old alluvium and the soils on flood plains in more recent alluvium. The soils on terraces are of the Allegheny, Braddock, Monongahela, Tygart, and Purdy series. The soils on flood plains are of the

for town and country planning—Continued

Local roads and streets	Playgrounds	Camp areas	Picnic areas	Paths and trails
Moderate: rippable bedrock at a depth of 1 to 1½ feet.	Severe: rippable bedrock at a depth of 1 to 1½ feet; coarse fragments on surface; droughty.	Slight	Slight	Slight.
Moderate: rippable bedrock at a depth of 1 to 1½ feet; slope.	Severe: rippable bedrock at a depth of 1 to 1½ feet; coarse fragments on surface; droughty; slope.	Moderate: slope	Moderate: slope	Slight.
Severe: slope	Severe: rippable bedrock at a depth of 1 to 1½ feet; coarse fragments on surface; droughty; slope.	Severe: slope	Severe: slope	Moderate: slope.
Severe: slope	Severe: rippable bedrock at a depth of 1 to 1½ feet; coarse fragments on surface; droughty; slope.	Severe: slope	Severe: slope	Severe: slope.
Severe: seasonal high water table at a depth of 1½ to 2 feet; moderate to high shrink-swell potential; high susceptibility to frost action.	Moderate: seasonal high water table at a depth of 1½ to 2 feet; slow permeability; slope.	Moderate: seasonal high water table at a depth of 1½ to 2 feet; slow permeability.	Slight	Slight.
Severe: seasonal high water table at a depth of 1½ to 2 feet; moderate to high shrink-swell potential; high susceptibility to frost action.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2 feet; slow permeability; slope.	Moderate: slope	Slight.
Severe: seasonal high water table at a depth of 1½ to 2 feet; moderate to high shrink-swell potential; high susceptibility to frost action.	Severe: slope	Moderate: seasonal high water table at a depth of 1½ to 2 feet; slow permeability; slope; very stony surface layer.	Moderate: slope	Moderate: very stony surface layer.

Huntington, Chagrin, Lindside, Pope, Philo, Atkins, and Melvin series. The parent materials of the soils on terraces and flood plains may be washed from either acid- or lime-influenced soils on uplands. In the survey area no lime-influenced terraces are recognized. The Huntington, Chagrin, Lindside, and Melvin soils are from lime-influenced materials. The soils on flood plains are constantly changing because of deposition and erosion by floods.

The soils on colluvial foot slopes formed in materials moved downslope by gravity and water. They are of the Clarksburg, Laidig, Buchanan, Andover, Ernest, Brinkerton, Murrill, and Rushtown series. All are deep and range from well drained to poorly drained.

Climate

Climate affects the formation of soils through its influence on the rate of weathering of rocks and the decomposition of minerals and organic matter. It also

affects biological activity in the soils and the leaching and movement of weathered minerals.

The climate of the survey area is semihumid continental. Rainfall ranges from 50 inches in western Mineral County to less than 32 inches near Romney and 35 inches in Morgan County. The difference in elevation between the Allegheny Plateau and the Ridge and Valley region accounts for a difference of several degrees in the range of temperature and a difference of 2 to 3 weeks in the length of the growing season. In 1970 the average annual maximum temperature at Romney was 65° F, and the average annual minimum temperature was 40°. For more detailed information on climate, see "Climate" in the section "General Nature of the Survey Area."

Living organisms

Living organisms, including plants, animals, insects, fungi, molds, and bacteria, influence the formation of soils in the survey area. Changes in content of organic matter and nitrogen and gains and losses in plant nutrients are largely brought about by living organisms.

Because fresh supplies of organic matter are added to the soils periodically, the organic matter in the soil is in all stages of decay. The soils in this survey area formed under forests, and they have or have had a layer of organic matter in the surface layer. Practically all the soils on uplands that have been cultivated have lost this layer, except where care has been taken to maintain it.

The Huntington soils, which are on flood plains, are naturally fertile, moderately permeable, and well drained, and organic matter breaks down rapidly in them. The Dunning soils, also on flood plains, are naturally fertile, slowly permeable, and poorly drained to very poorly drained, and organic matter breaks down slowly in them. This difference in living conditions for organisms that decompose the vegetation is indicated by the amount of undecomposed plant material on the surface of the Dunning soils. The less fertile Berks and Weikert soils on uplands do not produce much vegetation. What is produced decomposes rapidly or is removed by erosion.

Burrowing animals, earthworms, and man have mixed, turned over, and replaced parts of the soil. Trees bring up from deep in the soil nutrients that are translocated to the leaves, which fall on the surface and decompose. The Murrill and Murrill variant soils have low base exchange in the overlying material. The deeper material has high base exchange. Trees grow well on these soils, feeding on the deeper material. Many pH tests have shown that the organic surface layer of the Murrill soils has a higher pH than the mineral soil immediately below. The addition of fertilizers, lime, manure, and crop residue has changed the rate of soil formation at many places.

Relief

The difference in elevation between the highest and lowest points in the survey area is 2,890 feet. Most of the survey area lies between elevations of 900 and 1,700 feet. The Allegheny Plateau area, about 7 percent of the total area, lies mostly above 2,000 feet. The difference in elevation affects the climate, which largely determines the length of the growing season and the rate of soil formation.

Differences in relief can radically affect the amount of moisture and air in soils. With equal rainfall and similar parent material, gently sloping soils are more moist than steep soils, and soils on flats and in depressions are still wetter. On moderately sloping and steeper soils, runoff is generally greater and water intake is less. The profiles of the steeper soils seldom are so well developed as those of more nearly level soils, largely because less water passes through the steeper soils.

The gently sloping and strongly sloping Murrill, Laidig, Clarksburg, and Ernest soils on foot slopes and Monongahela, Allegheny, and Braddock soils on terraces have distinct horizons. The steeper Weikert, Berks, Dekalb, Lehew, and Calvin soils on uplands have less distinct horizons. Some soils on flood plains, though younger than the more sloping soils on uplands, have more strongly developed horizons.

The anticlinal and synclinal folding common to the Ridge and Valley region cause uneven weathering of bedrock. Many of the northwest-southeast trending shale foothills have escarpments or very steep slopes on the northeast side and moderate to steep slopes on the southwest side. The soils on northeast-facing slopes are deeper and contain more organic matter and have more strongly developed horizons than the soils on the southwest-facing slopes.

Time

Time is necessary for the formation of parent material and for the development of soils from parent material. The soils of the survey area have been developing since before glaciers covered the northern states. Erosion removed soil material from the steeper slopes almost as fast as it was formed. This material was then deposited downstream, sometimes miles from its origin, or was carried out to sea.

The loamy, erodible Berks, Weikert, and Calvin soils are low to very low in natural fertility. They are sparsely vegetated and produce little organic matter to replace the nutrients leached out or eroded away. The material washed from these soils probably picks up some nutrients from the water, but it generally forms infertile deposits downstream. The Pope, Philo, and Atkins soils are on flood plains. These soils formed in recently deposited material washed from relatively infertile soils on uplands. New material is deposited on these soils each time they are flooded. They do not have time to develop a strong profile similar to that of older soils on terraces that are not subject to flooding. The Monongahela, Allegeheny, Braddock, and Tygart soils on terraces have a more distinct horizon than the soils on flood plains.

Morphology of the Soils

In this section horizon nomenclature and the processes involved in horizon development are briefly described.

The results of the soil-forming factors can be distinguished by the different layers, or soil horizons,

seen in a soil profile. The soil profile extends from the surface downward to material that is little altered by soil-forming processes.

Most soils have three major horizons, called A, B, and C horizons (*10*). These major horizons can be further subdivided by the use of numbers and letters to indicate differences within one horizon. An example is the B2t horizon, which is a B horizon that contains an accumulation of clay.

The A horizon is the surface layer. An A1 horizon is that part of the surface layer with the largest accumulation of organic matter. The A horizon is also the layer of maximum leaching or eluviation of clay and iron. If considerable leaching has taken place and organic matter has not darkened the material, the horizon is called an A2 horizon. In some soils in the survey area the A2 horizon is brownish in color because of oxidation of iron.

The B horizon underlies the A horizon and is commonly called the subsoil. It is the horizon of maximum accumulation or illuviation of clay, iron, aluminum, or other compounds leached from the surface layer. In some soils the B horizon is formed by alteration in place rather than by illuviation. The alteration may be caused by oxidation and reduction of iron or by the weathering of clay minerals. The B horizon commonly has blocky or prismatic structure, and it generally is firmer and lighter colored than the A1 horizon but darker colored than the C horizon.

The C horizon is below the A or B horizon. It consists of materials that are little altered by soil-forming processes, but it can be modified by weathering.

Processes of soil horizon differentiation

In Hampshire, Mineral, and Morgan Counties several processes are involved in the formation of soil horizons. Among these are accumulation of organic matter, leaching of soluble salts, reduction and transfer of iron, formation of soil structure, and formation and translocation of clay minerals. These processes are continually taking place, generally at the same time throughout the profile. Such processes have been going on for thousands of years.

The accumulation and incorporation of organic matter take place with the decomposition of plant residue. These additions darken the surface layer and help to form the A1 horizon. Organic matter, once lost, generally takes a long time to replace. In the survey area the organic-matter content of the surface layer averages about 2.5 percent.

For soils to have a distinct subsoil horizon, it is believed, some of the lime and other soluble salts must be leached before the translocation of clay minerals. Among the factors that affect this leaching are the kinds of salts originally present, the depth to which the soil solution percolates, and the texture of the soil profile.

Well drained and moderately well drained soils in the survey area have a yellowish-brown or reddish-brown subsoil horizon. These colors are caused mainly by thin coatings of iron oxides on sand and silt grains; in such soils as those in the Lehew series, however, the colors are inherited from the reddish parent materials from which they formed. Mainly weak to moderate development of subangular blocky structure has taken place. The subsoil contains more clay than the surface layer.

A fragipan has developed in the subsoil of most of the moderately well drained and somewhat poorly drained soils in the survey area. These horizons are very firm and brittle when moist, and they are very hard when dry. Soil particles are tightly packed, so that bulk density is high and pore space is low. Genesis of these horizons is not fully understood, but studies show that swelling and shrinking take place in alternating wet and dry periods. This may account for the packing of soil particles and also for a gross polygonal pattern of cracks in the fragipan. Clay, silica, and oxides of aluminum are the most likely cementing agents causing brittleness and hardness.

Reduction and transfer of iron are associated mainly with the wetter, more poorly drained soils. This process is called gleying. Moderately well drained to somewhat poorly drained soils have mottles of yellowish brown and reddish brown that indicate the segregation of iron. In poorly drained to very poorly drained soils, such as the Melvin, Atkins, and Purdy soils, the subsoil and underlying material are grayish, which indicates reduction and transfer of iron by removal in solution.

Classification of Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas such as countries and continents.

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Because this system is under continual study, readers interested in developments of the system should search the latest literature available (*9, 11*).

This system has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped. In table 10, the soil series of Hampshire, Mineral, and Morgan counties are placed in four categories of the system. Classes of the system are briefly defined in the following paragraphs.

ORDER: Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils.

The two exceptions to this are the Entisols and Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Ent-i-sol).

SUBORDER: Each order is subdivided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of water-logging, or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order. An example is *Aquent* (*Aqu,* meaning water or wet, and *ent,* from Entisol).

GREAT GROUP: Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those that have pans that interfere with growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), dark-red and dark-brown colors associated with basic rocks, and the like. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder. An example is Haplaquents (*Hapl,* meaning simple horizons, *aqu* for wetness or water, and *ent,* from Entisols).

SUBGROUP: Great groups are subdivided into subgroups, one representing the central (typic) segment of the group, and others, called intergrades, that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is Typic Haplaquents (a typical Haplaquent).

FAMILY: Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture, mineralogy, and so on, that are used as family differentiae (see table 10). An example is the coarse-loamy, siliceous, acid, thermic family of Typic Haplaquents.

TABLE 10.—*Classification of soil series* [1]

Series	Family	Subgroup	Order
Albrights	Fine-loamy, mixed, mesic	Aquic Fragiudalfs	Alfisols.
Allegheny	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols.
Andover	Fine-loamy, mixed, mesic	Typic Fragiaquults	Ultisols.
Atkins	Fine-loamy, mixed, acid, mesic	Typic Fluvaquents	Entisols.
Berks	Loamy-skeletal, mixed, mesic	Typic Dystrochrepts	Inceptisols.
Braddock [2]	Clayey, mixed, mesic	Typic Hapludults	Ultisols.
Brinkerton	Fine-silty, mixed, mesic	Typic Fragiaqualfs	Alfisols.
Buchanan	Fine-loamy, mixed, mesic	Aquic Fragiudults	Ultisols.
Calvin	Loamy-skeletal, mixed, mesic	Typic Dystrochrepts	Inceptisols.
Chagrin	Fine-loamy, mixed, mesic	Dystric Fluventic Eutrochrepts	Inceptisols.
Clarksburg	Fine-loamy, mixed, mesic	Typic Fragiudalfs	Alfisols.
Dekalb	Loamy-skeletal, mixed, mesic	Typic Dystrochrepts	Inceptisols.
Dunning	Fine, mixed, mesic	Fluvaquentic Haplaquolls	Mollisols.
Edom	Fine, illitic, mesic	Typic Hapludalfs	Alfisols.
Edom variant	Fine, illitic, mesic	Typic Hapludalfs	Alfisols.
Elliber	Loamy-skeletal, mixed, mesic	Typic Hapludults	Ultisols.
Ernest	Fine-loamy, mixed, mesic	Aquic Fragiudults	Ultisols.
Gilpin	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols.
Huntington	Fine-silty, mixed, mesic	Fluventic Hapludolls	Mollisols.
Laidig	Fine-loamy, mixed, mesic	Typic Fragiudults	Ultisols.
Lehew	Loamy-skeletal, mixed, mesic	Typic Dystrochrepts	Inceptisols.
Lindside	Fine-silty, mixed, mesic	Fluvaquentic Eutrochrepts	Inceptisols.
Melvin	Fine-silty, mixed, nonacid, mesic	Typic Fluvaquents	Entisols.
Monongahela	Fine-loamy, mixed, mesic	Typic Fragiudults	Ultisols.
Murrill	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols.
Murrill variant	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols.
Opequon	Clayey, mixed, mesic	Lithic Hapludalfs	Alfisols.
Philo	Coarse-loamy, mixed, mesic	Fluvaquentic Dystrochrepts	Inceptisols.
Pope	Coarse-loamy, mixed, mesic	Fluventic Dystrochrepts	Inceptisols.
Purdy	Clayey, mixed, mesic	Typic Ochraquults	Ultisols.
Ramsey	Loamy, siliceous, mesic	Lithic Dystrochrepts	Inceptisols.
Rushtown	Loamy-skeletal over fragmental, mixed, mesic.	Typic Dystrochrepts	Inceptisols.
Schaffenaker	Mesic, coated	Typic Quartzipsamments	Entisols.
Tygart	Clayey, mixed, mesic	Aeric Ochraquults	Ultisols.
Weikert	Loamy-skeletal, mixed, mesic	Lithic Dystrochrepts	Inceptisols.
Wharton	Clayey, mixed, mesic	Aquic Hapludults	Ultisols.

[1] The following units are not classified to the series level: Fluvaquents, Lithic Udorthents, Strip mine, Typic Dystrochrepts, and Udifluvents.

[2] In this survey area, Braddock soils are a taxadjunct of the series, because they are less red in the B horizon than is defined as within the range for the Braddock series.

General Nature of the Survey Area

This section discusses the history and population of the survey area. Other factors considered are transportation; physiography, relief, and drainage; water supply; climate; and farming.

History and Population

Hampshire County, the oldest of the three counties in the survey area, was formed in 1754 from parts of Frederick and Augusta Counties, Virginia. Between 1786 and 1866 other counties and parts of counties were carved from the original Hampshire County land area. Mineral County was formed in 1866 from a part of western Hampshire County. Morgan County was formed in 1820 from a part of northern Hampshire County and the western part of Berkeley County.

The original settlers came from Pennsylvania, Maryland, and Virginia seeking new homes and cheaper land. They settled along the smooth, fertile flood plains and old river terraces.

The counties have largely maintained their rural character. A few light glass, plastics, and leather industries, however, have been established.

In 1970 Hampshire County had 11,710 people, Mineral County 23,109, and Morgan County 8,547. The population of the respective county seats was Romney, 2,364, Keyser, 6,586, and Berkeley Springs, 944. The population of the counties has remained relatively stable for many years. The population figures for Romney and for Keyser do show a modest increase. Berkeley Springs, on the other hand, appears to be declining in population.

Transportation

The counties are served by a network of rural roads and main highways, including U.S. Routes 50, 220, and 522. Two railroads provide freight service to the northern edge of the area. Freight lines run along the north and west edges of Mineral and Morgan Counties and through the western part of Hampshire County.

Physiography, Relief, and Drainage

The western part of Mineral County is within the high, rolling and hilly Allegheny Plateau physiographic province. The abrupt escarpment, the Allegheny Front, on the east separates the Allegheny Plateau province from the Ridge and Valley province. The Ridge and Valley province extends to the east across the rest of the survey area. It is a succession of parallel mountains, ridges, and narrow valleys extending roughly in a north-northeast direction. The Allegheny Plateau section of the survey area lies mostly between 2,000 and 3,000 feet above sea level. The Ridge and Valley section ranges in elevation from 360 to 2,700 feet. Within the Ridge and Valley section, the major flood plains range from 360 feet above sea level at the mouth of Cherry Run in Morgan County to about 1,350 feet at New Creek in Mineral County at the Grant County line.

The rock strata in the Plateau section are relatively flat-lying sandstone, siltstone, and shale. The rock strata in the Ridge and Valley section are strongly folded. Sandstone, siltstone, and shale are the predominant rock types in the Ridge and Valley section. Limestone is exposed as a result of erosion of the folded strata and influences some of the soils in the survey area.

Water Supply

Most of the water for domestic use in the survey area is supplied by wells. The quantity available varies from one aquifer to another and from one place to another within a given aquifer. The largest groundwater supplies are available from sandstone and carbonate-rock aquifers containing secondary openings such as faults, joints or solution cavities within the zone of saturation. The least water is available from shale and siltstone aquifers, which in places contain almost no secondary openings. Some wells have been drilled to depths of about 900 feet without obtaining a usable quantity of water. In contrast, a gas well near Springfield, Hampshire County, penetrating limestone at a depth of about 10,600 feet, produced 16 gallons per minute (*5*).

The survey area is bounded on the north by the Potomac River and the North Branch Potomac River. The major streams draining the area are New Creek, Patterson Creek, the South Branch Potomac River, Little Cacapon River, Cacapon River, and North River. These are perennial streams that flow north into the Potomac River. Many of the tributaries of these streams dry up late in summer.

Livestock water is supplied by streams, springs, and farm ponds. Impoundments built under Public Law 534 and the Soil Conservation District watershed program provide water for the towns of Keyser and Fort Ashby and reduce flooding by the major streams.

Climate [5]

The general climate of this survey area is classified as semihumid continental because of its relatively high and generally evenly distributed precipitation and its marked temperature contrasts between summer and winter. The varied topography, however, creates diversified local climates. The major climate regime is illustrated in the data from Romney, elevation 640 feet. These data are given in table 11.

The divide of the Alleghenies, the main topographic barrier of the Appalachian Plateau, runs through Mineral County and shelters this general area from the prevailing and more common storm systems that move from west to east and deposit most of their moisture on the windward slopes and higher ridges of the Alleghenies. This general area also lies beyond the immediate effects of the Atlantic Ocean, because it is sheltered somewhat from the more humid coastal climate by the Blue Ridge and Appalachian Mountains.

Annual precipitation averages about 50 inches along the divide in western Mineral County and drops to 32

[5] By ROBERT O. WEEDFALL, climatologist for West Virginia, National Weather Service, U.S. Department of Commerce.

TABLE 11.—*Temperature and precipitation data*

[All data from Romney, elevation 640 feet; based on records for the period 1954–70]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—		Average number of days with snow cover of 1 inch or more	Average depth of snow on days with snow cover
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—		
	°F	°F	°F	°F	*Inches*	*Inches*	*Inches*		*Inches*
January	41	20	58	0	1.99	0.5	3.9	6	3
February	44	22	61	4	2.20	.5	3.9	6	3
March	54	29	72	14	3.41	1.5	5.8	5	2
April	67	39	83	23	2.86	1.2	4.5	1	2
May	77	47	87	32	2.83	1.4	5.3	--	--
June	84	55	92	43	3.44	1.5	6.4	--	--
July	87	59	94	48	3.37	1.4	6.3	--	--
August	86	58	93	47	3.45	1.5	6.4	--	--
September	80	52	91	37	2.84	1.5	4.6	--	--
October	69	40	81	25	2.22	.5	4.5	--	--
November	55	32	71	17	1.95	.9	3.5	2	2
December	43	23	61	6	2.13	.6	4.1	8	3
Year	65	40	[1]97	[2]−6	32.69	28.2	38.4	31	3

[1] Average annual highest temperature.

[2] Average annual lowest temperature.

inches in the valleys in the Romney area; it is about 35 inches in eastern Morgan County. Heaviest precipitation occurs in spring and summer. During the warmer half of the year, the area is affected by showers and thunderstorms from the broad current of moist air that tends to sweep northeastward from the Gulf of Mexico and the South Atlantic. Thunderstorms occur on an average of 30 to 40 days each year and are more frequent at the higher elevations.

The intense thunderstorms and large area storms that are the remnants of hurricanes may cause flood damage as a result of their heavy rainfall. Many of the major one-day rainfalls are from these thunderstorms.

Dry spells and periods of drought occasionally distress farmers. Concern exists for an adequate water supply because of below-average rainfall during the drought years of the sixties, particularly during 1963–66. A greater-than-normal flow of drier air brought into this area by rain-inhibiting westerly or northwesterly winds during this period reduced the frequency of coastal storms. These coastal storms, including hurricanes and lesser tropical disturbances, account for an important part of the total precipitation in the survey area.

Pan evaporation data are available from the Wardensville weather station. The average pan evaporation from May through October is about 31 inches, and, by extrapolation, annual evaporation is 44 inches. Evaporation from reservoirs or lakes would be about 75 percent of these amounts, or 33 inches annually and 24 inches from May through October.

The topography affects the length of the growing season, which ranges from an average of 164 days at Piedmont (elevation 1,053 feet) to 106 days at Bayard (elevation 2,375 feet). Probability dates for the occurrence of temperatures of 32° F and lower in spring and in fall are given in table 12.

TABLE 12.—*Probabilities of last freezing temperatures in spring and first in fall*

[Data from Romney, elevation 640 feet]

Probability	Dates for given probability and temperature				
	16° or lower	20° or lower	24° or lower	28° or lower	32° or lower
Spring:					
1 year in 10 later than	March 23	April 1	April 19	May 8	May 21
1 year in 4 later than	March 16	March 25	April 12	May 1	May 14
1 year in 2 later than	March 8	March 17	April 4	April 23	May 6
3 years in 4 later than	February 28	March 9	March 27	April 15	April 28
9 years in 10 later than	February 21	March 2	March 20	April 8	April 21
Fall:					
1 year in 10 earlier than	November 17	November 3	October 17	October 3	September 22
1 year in 4 earlier than	November 23	November 9	October 23	October 9	September 28
1 year in 2 earlier than	November 30	November 16	October 30	October 16	October 5
3 years in 4 earlier than	December 7	November 23	November 6	October 23	October 12
9 years in 10 earlier than	December 13	November 29	November 12	October 29	October 18

Snowfall exhibits the same features of a real distribution caused by topography as rain. The higher Allegheny ridges along the western edge of the survey area receive more than 100 inches of snow annually. The lower elevations to the east average 20 to 40 inches annually. Coastal storms occasionally produce large daily snowfalls that block roads. The snow cover, however, usually lasts only a few days. The total amount of snow varies greatly from winter to winter. Mesoclimatic differences have an important effect on duration of snow cover. South-facing hillsides, for example, rapidly lose their snow cover during the frequent thawing periods.

This survey area has a moderately rigorous winter climate. Cold waves occur two or three times a year but seldom last longer than a few days. On the average, daytime temperatures remain at freezing or below about 15 days per year, and the temperature drops to zero or below about 3 times per year. In the lulls between storms, solar radiation is quite effective because of the relatively low latitude, and it results in many warm, sunny days in winter.

On an annual basis, cloud cover is about equally divided between clear days (0 to 30 percent cloudiness), partly cloudy days (30 to 80 percent cloudiness), and cloudy days (80 to 100 percent cloudiness).

Nighttime and early morning relative humidity averages are quite high and reflect the prevalent valley fogs, which are most common in summer and fall when moisture is abundant. Midday humidity values are moderate (about 40 to 55 percent), and the temperature-humidity combinations are usually at comfortable levels.

Calm or light winds prevail in the lulls between storms and occur most frequently late in summer and in fall, especially in the valleys. Based on data kept in Wardensville, winds are below 5 miles per hour 72 percent of the time (as much as 85 percent in July and as low as 54 percent in April, the windiest period). Damaging winds and tornadoes are extremely rare.

Farming

Farming is important to the economy of Hampshire, Mineral, and Morgan Counties. Of the 769,280 acres in the survey area, however, only about 39 percent is used for farming. The average size of a farm is 264 acres.

Land use has been stable in the survey area, although there has been a trend in the last decade for people from nearby cities to purchase small farms to be used as vacation or weekend homes and hunting camps. The 1970 West Virginia Soil and Water Conservation Needs Inventory indicates that about 74 percent of the area is wooded, 12 percent is pasture, 9 percent is cropland, and 5 percent is other land and water. The large area of woodland and the close proximity to the pulp and paper mill at Luke, Maryland, make the pulpwood industry important in the survey area.

The 1969 Census of Agriculture shows that in the survey area orchard fruits (fruits, nuts, and berries) are the greatest source of farm income and of sales on farms that have sales of $2,500 or more. About 83 percent of the income from the 54,945 acres of cropland in the area came from orchards on 5,976 acres. This income accounted for about 33 percent of all the income from farm enterprises, income from beef cattle accounted for about 24 percent, income from poultry and poultry products 16 percent, and income from dairy products 9 percent.

The farm enterprises vary in importance from county to county within the survey area. Orchard fruits and beef cattle are important in Hampshire County; dairy products, beef cattle, and poultry and poultry products are important in Mineral County; and orchard fruits are important in Morgan County.

Literature Cited

(1) Allan, Phillip E., Lloyd E. Garland, and R. Franklin Dugan. 1963. Rating northeastern soils for their suitability for wildlife habitat. 28th North Am. Wildl. Nat. Resour. Conf. Wildl. Manage. Inst. pp. 247–261, illus.

(2) American Association of State Highway [and Transportation] Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(3) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487–69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(4) Ferguson, Roland H. 1964. The timber resources of West Virginia. Forest Serv. Res. Bull., NE–2, 123 pp., illus.

(5) Hobba, W. A., Jr., E. A. Friel, and J. L. Chisholm. 1973. Ground water atlas of the Potomac River basin, West Virginia. W. Va. Geological and Economic Survey.

(6) McCarthy, E. F. 1933. Yellow-poplar characteristics, growth and management. U.S. Dep. Agric. Tech. Bull. 356, 58 pp., illus.

(7) Portland Cement Association. 1962. PCA soil primer 52 pp., illus.

(8) Schnur, G. Luther. 1937. Yield, stand, and volume tables for even-aged upland oak forest. U.S. Dep. Agric. Tech. Bull. 560, 88 pp., illus.

(9) Simonson, Roy W. 1962. Soil classification in the United States. Science 137: 1027–1034, illus.

(10) United States Department of Agriculture. 1951. Soil Survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplement replacing pp. 173–188 issued May 1962]

(11) ———— 1960. Soil classification, a comprehensive system, 7th approximation. Soil Conserv. Serv., 265 pp., illus. [Supplements issued in March 1967 and September 1968]

(12) ———— 1961. Yield of virginia pine. Forest Serv. Southeast. Forest Exp. Sta. Pap. 124, 11 pp.

Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Aspect. The direction toward which a slope faces.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Channery soil. A soil that contains thin, flat fragments of sandstone, limestone, or schist, as much as 6 inches in length along the longer axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused by (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Karst topography. Relief marked by sinks interspersed with abrupt ridges and protuberant rocks and by caverns and underground streams.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Residuum. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residuum is

not soil but is frequently material in which a soil has formed.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structures are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and the description of the soil series to which the mapping unit belongs. In referring to a capability unit or woodland group, read the introduction to the section it is in for general information about its management. Dashes indicate that the mapping unit was not assigned to a capability unit. Other information is given in tables as follows:

Acreage and extent, table 1, page 8.
Estimated yields, table 2, page 59.
Woodland suitability of soils, table 3, page 62.
Suitability of soils for wildlife habitat, table 5, page 82.
Engineering uses of soils, tables 6, 7, and 8, pages 88 through 103.
Town and country planning, table 9, page 106.

Map symbol	Mapping unit	Described on page	Capability unit	Woodland suitability subclass 1/
			Symbol	Number
AbB	Albrights silt loam, 3 to 8 percent slopes	11	IIe-14	3w
AbC	Albrights silt loam, 8 to 15 percent slopes	11	IIIe-14	3w
AfB	Allegheny fine sandy loam, 3 to 8 percent slopes	12	IIe-4	3o
AgB	Allegheny silt loam, 3 to 8 percent slopes	12	IIe-4	3o
AgC	Allegheny silt loam, 8 to 15 percent slopes	12	IIIe-4	3o
ArB	Andover and Brinkerton very stony soils, 3 to 8 percent slopes	13	VIIs-5	2w
At	Atkins silt loam	13	IIIw-1	1w
Ay	Atkins silty clay loam	14	IVw-1	1w
BcB	Berks channery silt loam, 3 to 8 percent slopes	14	IIe-10	4f
BcC	Berks channery silt loam, 8 to 15 percent slopes	14	IIIe-10	4f
BcC3	Berks channery silt loam, 8 to 15 percent slopes, severely eroded	15	IVe-3	4f
BcD	Berks channery silt loam, 15 to 25 percent slopes	15	IVe-3	4f, 5f
BcD3	Berks channery silt loam, 15 to 25 percent slopes, severely eroded	15	VIe-2	4f, 5f
BcE	Berks channery silt loam, 25 to 35 percent slopes	15	VIe-2	4f, 5f
BcE3	Berks channery silt loam, 25 to 35 percent slopes, severely eroded	15	VIIe-2	4f, 5f
BcF	Berks channery silt loam, 35 to 65 percent slopes	15	VIIe-2	4f, 5f
BkB	Berks shaly silt loam, 3 to 8 percent slopes	15	IIIe-32	5f
BkC	Berks shaly silt loam, 8 to 15 percent slopes	16	IVe-32	5f
BkC3	Berks shaly silt loam, 8 to 15 percent slopes, severely eroded	16	VIe-31	5f
BkD	Berks shaly silt loam, 15 to 25 percent slopes	16	VIe-31	5f, 6f
BkD3	Berks shaly silt loam, 15 to 25 percent slopes, severely eroded	16	VIIe-3	5f, 6f
BkE3	Berks shaly silt loam, 25 to 35 percent slopes, severely eroded	16	VIIe-3	5f, 6f
BkF	Berks shaly silt loam, 35 to 65 percent slopes	16	VIIe-3	5f, 6f
BrB	Braddock gravelly loam, 3 to 8 percent slopes	17	IIe-4	3o
BrC	Braddock gravelly loam, 8 to 15 percent slopes	17	IIIe-4	3o
BsB	Brinkerton silt loam, 3 to 8 percent slopes	18	IVw-5	2w
BuB	Buchanan channery loam, 3 to 8 percent slopes	19	IIe-13	3o
BuC	Buchanan channery loam, 8 to 15 percent slopes	19	IIIe-13	3o
BvC	Buchanan very stony loam, 3 to 15 percent slopes	19	VIs-2	3o
BvD	Buchanan very stony loam, 15 to 25 percent slopes	19	VIs-2	3o
CaD	Calvin silt loam, 15 to 25 percent slopes	20	IVe-11	2f, 3f
CbC	Calvin channery silt loam, 8 to 25 percent slopes	20	IVe-3	4f
CcF	Calvin extremely stony silt loam, 35 to 65 percent slopes	20	VIIs-4	2x, 3x
Cg	Chagrin fine sandy loam	21	IIw-6	1o
CkB	Clarksburg channery silt loam, 3 to 8 percent slopes	22	IIe-14	3w
CkC	Clarksburg channery silt loam, 8 to 15 percent slopes	22	IIIe-14	3w
ClC	Clarksburg very stony silt loam, 3 to 15 percent slopes	22	VIs-1	3w
ClD	Clarksburg very stony silt loam, 15 to 25 percent slopes	22	VIs-1	3w
DlC	Dekalb and Lehew very stony sandy loams, 3 to 15 percent slopes	23	VIIs-2	4f
DlE	Dekalb and Lehew very stony sandy loams, 15 to 35 percent slopes	23	VIIs-2	4f, 5f
DlF	Dekalb and Lehew very stony sandy loams, 35 to 65 percent slopes	23	VIIs-2	4f, 5f
Du	Dunning silty clay loam	24	IVw-1	1w
EaC	Edom silt loam, 8 to 15 percent slopes	25	IIIe-11	3c
EaD	Edom silt loam, 15 to 25 percent slopes	25	IVe-11	3c, 4c
EaE	Edom silt loam, 25 to 35 percent slopes	25	VIe-1	3c, 4c
EbC3	Edom silty clay loam, 8 to 15 percent slopes, severely eroded	26	IVe-11	3c
EbD3	Edom silty clay loam, 15 to 25 percent slopes, severely eroded	26	VIe-1	3c, 4c
EbF3	Edom silty clay loam, 25 to 65 percent slopes, severely eroded	26	VIIe-1	3c, 4c

Map symbol	Mapping unit	Described on page	Capability unit	Woodland suitability subclass 1/
			Symbol	Number
EcC	Edom silt loam, moderately shallow variant, 8 to 15 percent slopes	27	IVe-31	4c
EcD	Edom silt loam, moderately shallow variant, 15 to 25 percent slopes	27	VIe-31	4c, 5c
EcE	Edom silt loam, moderately shallow variant, 25 to 35 percent slopes	27	VIIe-3	4c, 5c
EdC3	Edom silty clay loam, moderately shallow variant, 8 to 15 percent slopes, severely eroded	27	VIe-31	4c
EdD3	Edom silty clay loam, moderately shallow variant, 15 to 25 percent slopes, severely eroded	27	VIIe-3	4c, 5c
ElC	Elliber very cherty loam, 8 to 15 percent slopes	28	IVs-26	3f
ElD	Elliber very cherty loam, 15 to 25 percent slopes	28	VIs-26	2f, 3f
ElE	Elliber very cherty loam, 25 to 35 percent slopes	28	VIIs-26	2f, 3f
EmE	Elliber very stony loam, 15 to 35 percent slopes	28	VIIs-1	2f, 3f
EmF	Elliber very stony loam, 35 to 65 percent slopes	28	VIIs-1	2f, 3f
ErB	Ernest silt loam, 3 to 8 percent slopes	29	IIe-13	3w
ErC	Ernest silt loam, 8 to 15 percent slopes	29	IIIe-13	3w
Es	Ernest very stony silt loam	29	VIs-2	2w
FA	Fluvaquents	29	VIw-1	2w
GlB	Gilpin silt loam, 3 to 8 percent slopes	30	IIe-10	2o
GlC	Gilpin silt loam, 8 to 15 percent slopes	30	IIIe-10	2o
GlD	Gilpin silt loam, 15 to 25 percent slopes	31	IVe-3	2r, 3r
GlE	Gilpin silt loam, 25 to 35 percent slopes	31	VIe-2	2r, 3r
GmC	Gilpin extremely stony silt loam, 3 to 15 percent slopes	32	VIIs-4	2x
GmF	Gilpin extremely stony silt loam, 25 to 65 percent slopes	32	VIIs-4	2x, 3x
Hu	Huntington loam	32	I-6	1o
LaB	Laidig channery loam, 3 to 8 percent slopes	33	IIe-4	3o
LaC	Laidig channery loam, 8 to 15 percent slopes	33	IIIe-4	3o
LaD	Laidig channery loam, 15 to 25 percent slopes	33	IVe-3	3r
LbC	Laidig very stony loam, 3 to 15 percent slopes	33	VIs-2	3o
LbD	Laidig very stony loam, 15 to 25 percent slopes	34	VIs-2	3r
LcE	Laidig extremely stony loam, 25 to 35 percent slopes	34	VIIs-4	3x
LeB	Lehew channery fine sandy loam, 3 to 8 percent slopes	34	IIe-12	4f
LeB3	Lehew channery fine sandy loam, 3 to 8 percent slopes, severely eroded	35	IIIe-12	4f
LeC	Lehew channery fine sandy loam, 8 to 15 percent slopes	35	IIIe-12	4f
LeC3	Lehew channery fine sandy loam, 8 to 15 percent slopes, severely eroded	35	IVe-5	4f
LeD	Lehew channery fine sandy loam, 15 to 25 percent slopes	35	IVe-5	4f, 5f
LeD3	Lehew channery fine sandy loam, 15 to 25 percent slopes, severely eroded	35	VIe-2	4f, 5f
LeE	Lehew channery fine sandy loam, 25 to 35 percent slopes	35	VIIe-2	4f, 5f
LeF	Lehew channery fine sandy loam, 35 to 65 percent slopes	36	VIIe-2	4f, 5f
LkB	Lehew-Berks complex, 3 to 8 percent slopes	36	IIe-12	4f
LkB3	Lehew-Berks complex, 3 to 8 percent slopes, severely eroded	36	IIIe-12	4f
LkC	Lehew-Berks complex, 8 to 15 percent slopes	36	IIIe-12	4f
LkC3	Lehew-Berks complex, 8 to 15 percent slopes, severely eroded	36	IVe-5	4f
LkD	Lehew-Berks complex, 15 to 25 percent slopes	36	IVe-5	4f, 5f
LkD3	Lehew-Berks complex, 15 to 25 percent slopes, severely eroded	37	VIe-2	4f, 5f
LkE	Lehew-Berks complex, 25 to 35 percent slopes	37	VIIe-2	4f, 5f
LkF	Lehew-Berks complex, 35 to 65 percent slopes	37	VIIe-2	4f, 5f
LlC	Lehew-Dekalb flaggy fine sandy loams, 8 to 15 percent slopes	37	IIIe-12	4f
LlD	Lehew-Dekalb flaggy fine sandy loams, 15 to 25 percent slopes	37	IVe-5	4f, 5f
LlE	Lehew-Dekalb flaggy fine sandy loams, 25 to 35 percent slopes	37	VIIe-2	4f, 5f
LlF	Lehew-Dekalb flaggy fine sandy loams, 35 to 65 percent slopes	38	VIIe-2	4f, 5f
Ln	Lindside silt loam	38	IIw-7	1w
LR	Lithic Udorthents-Rock outcrop complex	39	VIIIe-31	6d
Me	Melvin silt loam	39	IIIw-1	1w
MhA	Monongahela silt loam, 0 to 3 percent slopes	40	IIw-1	4w
MhB	Monongahela silt loam, 3 to 8 percent slopes	40	IIe-13	4w
MhC	Monongahela silt loam, 8 to 15 percent slopes	40	IIIe-13	4w
MhC3	Monongahela silt loam, 8 to 15 percent slopes, severely eroded	40	IVe-9	4w

GUIDE TO MAPPING UNITS--Continued

Map symbol	Mapping unit	Described on page	Capability unit	Woodland suitability subclass 1/
			Symbol	Number
M1B	Murrill channery loam, 3 to 8 percent slopes	41	IIe-1	3o
M1C	Murrill channery loam, 8 to 15 percent slopes	41	IIIe-1	3o
M1D	Murrill channery loam, 15 to 25 percent slopes	42	IVe-1	3r
MsC	Murrill very stony loam, 3 to 15 percent slopes	42	VIs-1	3o
MsD	Murrill very stony loam, 15 to 25 percent slopes	42	VIs-1	3r
MsE	Murrill very stony loam, 25 to 35 percent slopes	42	VIIs-1	3r
MvB	Murrill channery loam, clayey subsoil variant, 3 to 8 percent slopes	43	IIe-1	3o
MvC	Murrill channery loam, clayey subsoil variant, 8 to 15 percent slopes	43	IIIe-1	3o
MvD	Murrill channery loam, clayey subsoil variant, 15 to 25 percent slopes	43	IVe-1	3r
OpD	Opequon-Rock outcrop complex, 8 to 25 percent slopes	44	VIs-1	3x
OpD3	Opequon-Rock outcrop complex, 8 to 25 percent slopes, severely eroded	44	VIIs-1	3x
OpF	Opequon-Rock outcrop complex, 25 to 65 percent slopes	44	VIIs-1	3x, 4x
Pf	Philo fine sandy loam	45	IIw-7	1w
Pg	Philo gravelly loam	45	IIw-7	1w
Ph	Philo silt loam	45	IIw-7	1w
Pm	Pope fine sandy loam	46	IIw-6	2o
Po	Pope silt loam	46	IIw-6	2o
Ps	Pope gravelly sandy loam	46	IIw-6	2o
Pu	Purdy silty clay loam	47	IVw-1	1w
RdD	Ramsey-Dekalb extremely stony sandy loams, 8 to 25 percent slopes	47	VIIs-4	6x
RdF	Ramsey-Dekalb extremely stony sandy loams, 25 to 65 percent slopes	47	VIIs-4	5x, 6x
Rn	Rubble land	47	VIIIs-1	------
RuD	Rushtown shaly silt loam, 8 to 25 percent slopes	49	VIe-31	4f
RuF	Rushtown shaly silt loam, 35 to 65 percent slopes	49	VIIe-3	4f
ShC	Schaffenaker very stony loamy sand, 3 to 15 percent slopes	49	VIIs-2	4s
ShE	Schaffenaker very stony loamy sand, 15 to 35 percent slopes	50	VIIs-2	4s, 5s
ShF	Schaffenaker very stony loamy sand, 35 to 65 percent slopes	50	VIIs-2	4s, 5s
SM	Strip mine	50	--------	------
Tg	Tygart silt loam	51	IIIw-5	2w
TPC	Typic Dystrochrepts, stony, rolling	51	VIIs-4	5x
TPE	Typic Dystrochrepts, stony, steep	51	VIIs-4	5x
UF	Udifluvents and Fluvaquents, very gravelly	51	VIIIs-6	------
WeB3	Weikert shaly silt loam, 3 to 8 percent slopes, severely eroded	52	VIs-32	6d
WeC3	Weikert shaly silt loam, 8 to 15 percent slopes, severely eroded	52	VIIs-32	6d
WeD3	Weikert shaly silt loam, 15 to 25 percent slopes, severely eroded	52	VIIs-32	5d, 6d
WeE3	Weikert shaly silt loam, 25 to 35 percent slopes, severely eroded	52	VIIs-32	5d, 6d
WeF3	Weikert shaly silt loam, 35 to 65 percent slopes, severely eroded	52	VIIs-32	5d, 6d
WkB	Weikert-Berks complex, 3 to 8 percent slopes	53	IIIe-32	4d
WkC	Weikert-Berks complex, 8 to 15 percent slopes	53	IVe-32	4d
WkD	Weikert-Berks complex, 15 to 25 percent slopes	53	VIe-31	4d, 5d
WkE	Weikert-Berks complex, 25 to 35 percent slopes	53	VIIe-3	4d, 5d
WkF	Weikert-Berks complex, 35 to 65 percent slopes	53	VIIe-3	4d, 5d
WnB	Wharton silt loam, 3 to 8 percent slopes	54	IIe-13	2w
WnC	Wharton silt loam, 8 to 15 percent slopes	54	IIIe-13	2w
WoC	Wharton very stony silt loam, 3 to 15 percent slopes	54	VIs-2	2w

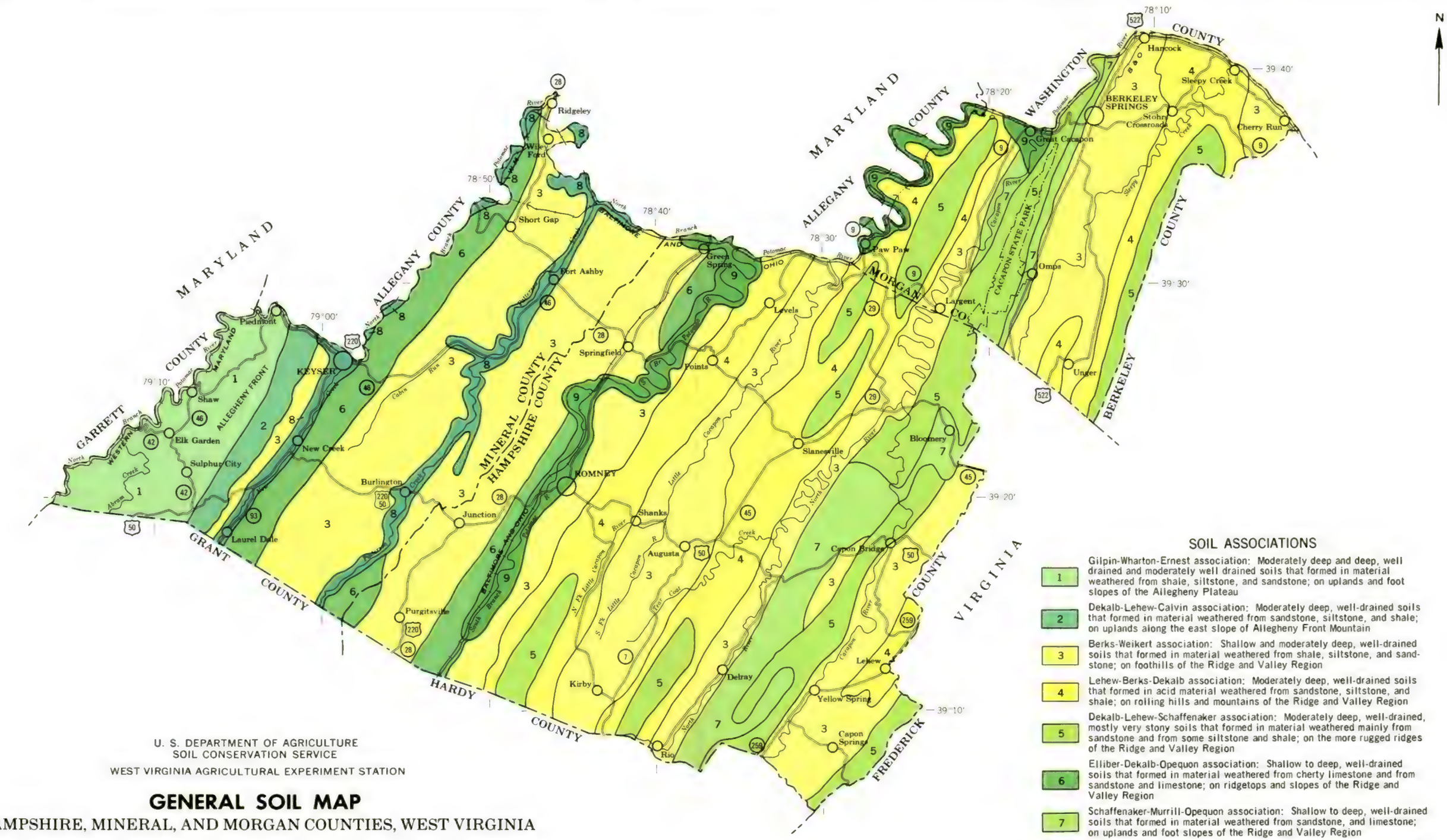
1/ Where two woodland suitability subclass symbols are shown, the first symbol is for north aspect and the second symbol is for south aspect.

☆ U S. GOVERNMENT PRINTING OFFICE: 1978— 594-256/62

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WEST VIRGINIA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA

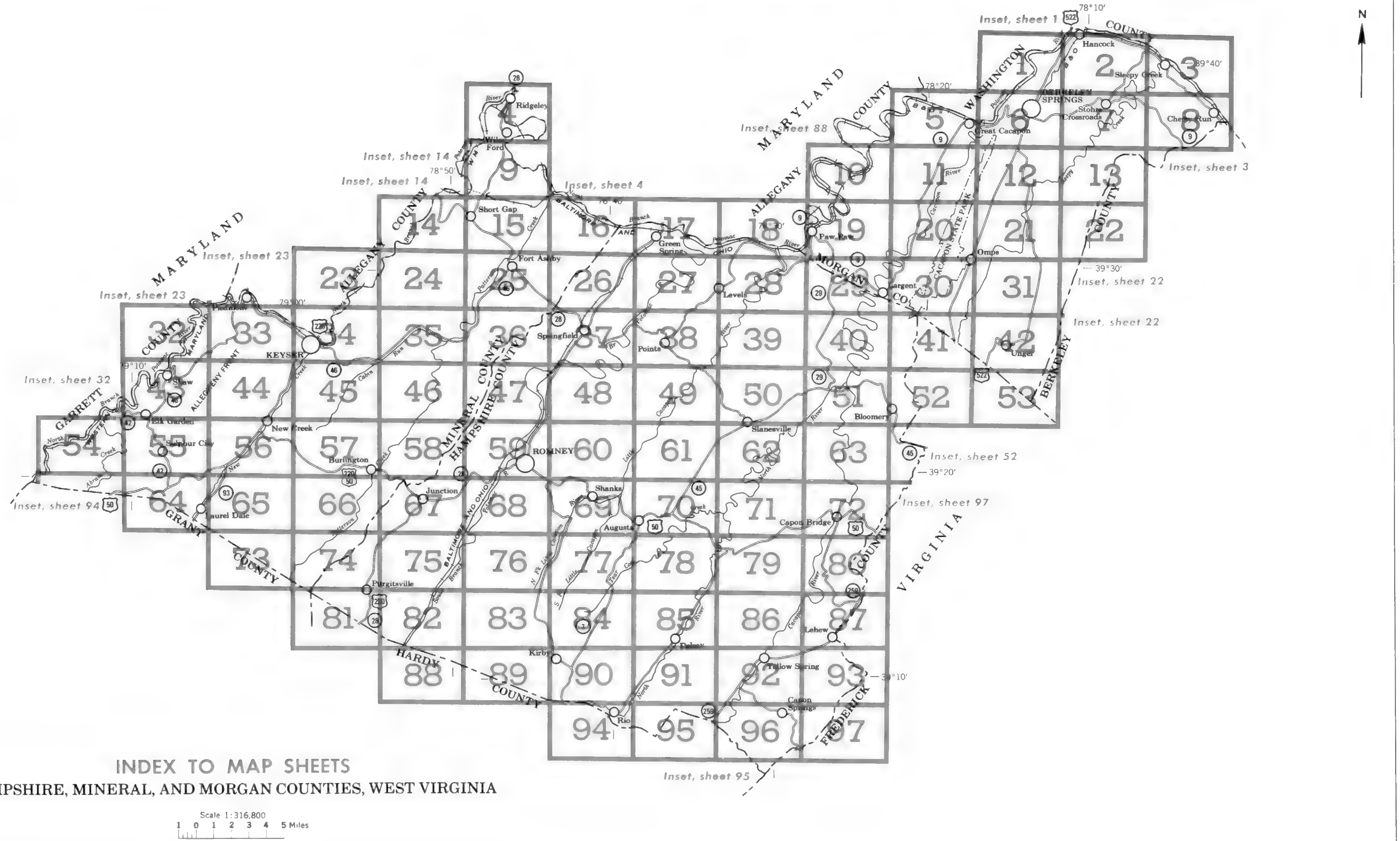
Scale 1:316,800
1 0 1 2 3 4 5 Miles

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SOIL ASSOCIATIONS

1. Gilpin-Wharton-Ernest association: Moderately deep and deep, well drained and moderately well drained soils that formed in material weathered from shale, siltstone, and sandstone; on uplands and foot slopes of the Allegheny Plateau
2. Dekalb-Lehew-Calvin association: Moderately deep, well-drained soils that formed in material weathered from sandstone, siltstone, and shale; on uplands along the east slope of Allegheny Front Mountain
3. Berks-Weikert association: Shallow and moderately deep, well-drained soils that formed in material weathered from shale, siltstone, and sandstone; on foothills of the Ridge and Valley Region
4. Lehew-Berks-Dekalb association: Moderately deep, well-drained soils that formed in acid material weathered from sandstone, siltstone, and shale; on rolling hills and mountains of the Ridge and Valley Region
5. Dekalb-Lehew-Schaffenaker association: Moderately deep, well-drained, mostly very stony soils that formed in material weathered mainly from sandstone and from some siltstone and shale; on the more rugged ridges of the Ridge and Valley Region
6. Elliber-Dekalb-Opequon association: Shallow to deep, well-drained soils that formed in material weathered from cherty limestone and from sandstone and limestone; on ridgetops and slopes of the Ridge and Valley Region
7. Schaffenaker-Murrill-Opequon association: Shallow to deep, well-drained soils that formed in material weathered from sandstone, and limestone; on uplands and foot slopes of the Ridge and Valley Region
8. Pope-Monongahela-Tygart association: Deep, well drained to somewhat poorly drained soils that formed in acid material; on flood plains and terraces of the Ridge and Valley Region
9. Monongahela-Chagrin-Lindside association: Deep, moderately well drained and well drained soils that formed in acid material on terraces and in lime-influenced material on flood plains of the Ridge and Valley Region

Compiled 1976



INDEX TO MAP SHEETS

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA

SOIL LEGEND

The first letter, always a capital, is the initial letter of the mapping unit name. The second letter is a capital if the mapping unit is broadly defined; otherwise, it is a small letter. The third letter, always a capital, A, B, C, D, E, or F, shows the slope class. Most symbols without slope letters are those for nearly level soils, but some are for miscellaneous land types, or undifferentiated groups that have a fair to considerable range of slope. A final number 3, in the symbol shows that the soil is severely eroded.

SYMBOL	NAME
AbB	Albrights silt loam, 3 to 8 percent slopes
AbC	Albrights silt loam, 8 to 15 percent slopes
AfB	Allegheny fine sandy loam, 3 to 8 percent slopes
AgB	Allegheny silt loam, 3 to 8 percent slopes
AgC	Allegheny silt loam, 8 to 15 percent slopes
ArB	Andover and Brinkerton very stony soils, 3 to 8 percent slopes
At	Atkins silt loam
Ay	Atkins silty clay loam
BcB	Berks channery silt loam, 3 to 8 percent slopes
BcC	Berks channery silt loam, 8 to 15 percent slopes
BcC3	Berks channery silt loam, 8 to 15 percent slopes, severely eroded
BcD	Berks channery silt loam, 15 to 25 percent slopes
BcD3	Berks channery silt loam, 15 to 25 percent slopes, severely eroded
BcE	Berks channery silt loam, 25 to 35 percent slopes
BcE3	Berks channery silt loam, 25 to 35 percent slopes, severely eroded
BcF	Berks channery silt loam, 35 to 65 percent slopes
BkB	Berks shaly silt loam, 3 to 8 percent slopes
BkC	Berks shaly silt loam, 8 to 15 percent slopes
BkC3	Berks shaly silt loam, 8 to 15 percent slopes, severely eroded
BkD	Berks shaly silt loam, 15 to 25 percent slopes
BkD3	Berks shaly silt loam, 15 to 25 percent slopes, severely eroded
BkE3	Berks shaly silt loam, 25 to 35 percent slopes, severely eroded
BkF	Berks shaly silt loam, 35 to 65 percent slopes
BrB	Braddock gravelly loam, 3 to 8 percent slopes
BrC	Braddock gravelly loam, 8 to 15 percent slopes
BsB	Brinkerton silt loam, 3 to 8 percent slopes
BuB	Buchanan channery loam, 3 to 8 percent slopes
BuC	Buchanan channery loam, 8 to 15 percent slopes
BvC	Buchanan very stony loam, 3 to 15 percent slopes
BvD	Buchanan very stony loam, 15 to 25 percent slopes
CaD	Calvin silt loam, 15 to 25 percent slopes
CbC	Calvin channery silt loam, 8 to 25 percent slopes
CcF	Calvin extremely stony silt loam, 35 to 65 percent slopes
Cg	Chagrin fine sandy loam
CkB	Clarksburg channery silt loam, 3 to 8 percent slopes
CkC	Clarksburg channery silt loam, 8 to 15 percent slopes
ClC	Clarksburg very stony silt loam, 3 to 15 percent slopes
ClD	Clarksburg very stony silt loam, 15 to 25 percent slopes
DlC	Dekalb and Lehew very stony sandy loams, 3 to 15 percent slopes
DlE	Dekalb and Lehew very stony sandy loams, 15 to 35 percent slopes
DlF	Dekalb and Lehew very stony sandy loams, 35 to 65 percent slopes
Du	Dunning silty clay loam
EaC	Edom silt loam, 8 to 15 percent slopes
EaD	Edom silt loam, 15 to 25 percent slopes
EaE	Edom silt loam, 25 to 35 percent slopes
EbC3	Edom silty clay loam, 8 to 15 percent slopes, severely eroded
EbD3	Edom silty clay loam, 15 to 25 percent slopes, severely eroded
EbF3	Edom silty clay loam, 25 to 65 percent slopes, severely eroded
EcC	Edom silt loam, moderately shallow variant, 8 to 15 percent slopes
EcD	Edom silt loam, moderately shallow variant, 15 to 25 percent slopes
EcE	Edom silt loam, moderately shallow variant, 25 to 35 percent slopes
EdC3	Edom silty clay loam, moderately shallow variant, 8 to 15 percent slopes, severely eroded
EdD3	Edom silty clay loam, moderately shallow variant, 15 to 25 percent slopes, severely eroded
ElC	Elliber very cherty loam, 8 to 15 percent slopes
ElD	Elliber very cherty loam, 15 to 25 percent slopes
ElE	Elliber very cherty loam, 25 to 35 percent slopes
EmE	Elliber very stony loam, 15 to 35 percent slopes
EmF	Elliber very stony loam, 35 to 65 percent slopes
ErB	Ernest silt loam, 3 to 8 percent slopes
ErC	Ernest silt loam, 8 to 15 percent slopes
Es	Ernest very stony silt loam
FA	Fluvaquents *
GlB	Gilpin silt loam, 3 to 8 percent slopes
GlC	Gilpin silt loam, 8 to 15 percent slopes
GlD	Gilpin silt loam, 15 to 25 percent slopes
GlE	Gilpin silt loam, 25 to 35 percent slopes
GmC	Gilpin extremely stony silt loam, 3 to 15 percent slopes
GmF	Gilpin extremely stony silt loam, 25 to 65 percent slopes
Hu	Huntington loam
LaB	Laidig channery loam, 3 to 8 percent slopes
LaC	Laidig channery loam, 8 to 15 percent slopes
LaD	Laidig channery loam, 15 to 25 percent slopes
LbC	Laidig very stony loam, 3 to 15 percent slopes
LbD	Laidig very stony loam, 15 to 25 percent slopes
LcE	Laidig extremely stony loam, 25 to 35 percent slopes
LeB	Lehew channery fine sandy loam, 3 to 8 percent slopes
LeB3	Lehew channery fine sandy loam, 3 to 8 percent slopes, severely eroded
LeC	Lehew channery fine sandy loam, 8 to 15 percent slopes
LeC3	Lehew channery fine sandy loam, 8 to 15 percent slopes, severely eroded
LeD	Lehew channery fine sandy loam, 15 to 25 percent slopes
LeD3	Lehew channery fine sandy loam, 15 to 25 percent slopes, severely eroded
LeE	Lehew channery fine sandy loam, 25 to 35 percent slopes
LeF	Lehew channery fine sandy loam, 35 to 65 percent slopes
LkB	Lehew-Berks complex, 3 to 8 percent slopes
LkB3	Lehew-Berks complex, 3 to 8 percent slopes, severely eroded
LkC	Lehew-Berks complex, 8 to 15 percent slopes
LkC3	Lehew-Berks complex, 8 to 15 percent slopes, severely eroded
LkD	Lehew-Berks complex, 15 to 25 percent slopes
LkD3	Lehew-Berks complex, 15 to 25 percent slopes, severely eroded
LkE	Lehew-Berks complex, 25 to 35 percent slopes
LkF	Lehew-Berks complex, 35 to 65 percent slopes
LlC	Lehew-Dekalb flaggy fine sandy loams, 8 to 15 percent slopes
LlD	Lehew-Dekalb flaggy fine sandy loams, 15 to 25 percent slopes
LlE	Lehew-Dekalb flaggy fine sandy loams, 25 to 35 percent slopes
LlF	Lehew-Dekalb flaggy fine sandy loams, 35 to 65 percent slopes
Ln	Lindside silt loam
LR	Lithic Udorthents-Rock outcrop complex *
Me	Melvin silt loam
MhA	Monongahela silt loam, 0 to 3 percent slopes
MhB	Monongahela silt loam, 3 to 8 percent slopes
MhC	Monongahela silt loam, 8 to 15 percent slopes
MhC3	Monongahela silt loam, 8 to 15 percent slopes, severely eroded
MlB	Murrill channery loam, 3 to 8 percent slopes
MlC	Murrill channery loam, 8 to 15 percent slopes
MlD	Murrill channery loam, 15 to 25 percent slopes
MsC	Murrill very stony loam, 3 to 15 percent slopes
MsD	Murrill very stony loam, 15 to 25 percent slopes
MsE	Murrill very stony loam, 25 to 35 percent slopes
MvB	Murrill channery loam, clayey subsoil variant, 3 to 8 percent slopes
MvC	Murrill channery loam, clayey subsoil variant, 8 to 15 percent slopes
MvD	Murrill channery loam, clayey subsoil variant, 15 to 25 percent slopes
OpD	Opequon-Rock outcrop complex, 8 to 25 percent slopes
OpD3	Opequon-Rock outcrop complex, 8 to 25 percent slopes, severely eroded
OpF	Opequon-Rock outcrop complex, 25 to 65 percent slopes
Pf	Philo fine sandy loam
Pg	Philo gravelly loam
Ph	Philo silt loam
Pm	Pope fine sandy loam
Po	Pope silt loam
Ps	Pope gravelly sandy loam
Pu	Purdy silty clay loam
RdD	Ramsey-Dekalb extremely stony sandy loams, 8 to 25 percent slopes
RdF	Ramsey-Dekalb extremely stony sandy loams, 25 to 65 percent slopes
Rn	Rubble land
RuD	Rushtown shaly silt loam, 8 to 25 percent slopes
RuF	Rushtown shaly silt loam, 35 to 65 percent slopes
ShC	Schaffenaker very stony loamy sand, 3 to 15 percent slopes
ShE	Schaffenaker very stony loamy sand, 15 to 35 percent slopes
ShF	Schaffenaker very stony loamy sand, 35 to 65 percent slopes
SM	Strip mine *
Tg	Tygart silt loam
TPC	Typic Dystrochrepts, stony, rolling *
TPE	Typic Dystrochrepts, stony, steep *
UF	Udifluvents and Fluvaquents, very gravelly *
WeB3	Weikert shaly silt loam, 3 to 8 percent slopes, severely eroded
WeC3	Weikert shaly silt loam, 8 to 15 percent slopes, severely eroded
WeD3	Weikert shaly silt loam, 15 to 25 percent slopes, severely eroded
WeE3	Weikert shaly silt loam, 25 to 35 percent slopes, severely eroded
WeF3	Weikert shaly silt loam, 35 to 65 percent slopes, severely eroded
WkB	Weikert-Berks complex, 3 to 8 percent slopes
WkC	Weikert-Berks complex, 8 to 15 percent slopes
WkD	Weikert-Berks complex, 15 to 25 percent slopes
WkE	Weikert-Berks complex, 25 to 35 percent slopes
WkF	Weikert-Berks complex, 35 to 65 percent slopes
WnB	Wharton silt loam, 3 to 8 percent slopes
WnC	Wharton silt loam, 8 to 15 percent slopes
WoC	Wharton very stony silt loam, 3 to 15 percent slopes

* The composition of these units is more variable than that of the others in the survey area but has been controlled well enough to be interpreted for the expected use of the soils.

HAMPSHIRE, MINERAL AND MORGAN COUNTIES, WEST VIRGINIA

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool (Davis Airstrip; FLOOD POOL LINE)

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate (79)
- Federal (410)
- State (92)
- County, farm or ranch (378)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small (water)

PITS

- Gravel pit
- Mine or quarry (QU)

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (GAS)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) (CANAL)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial (water)
- Intermittent (wet)

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (CeA, FoB2)

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

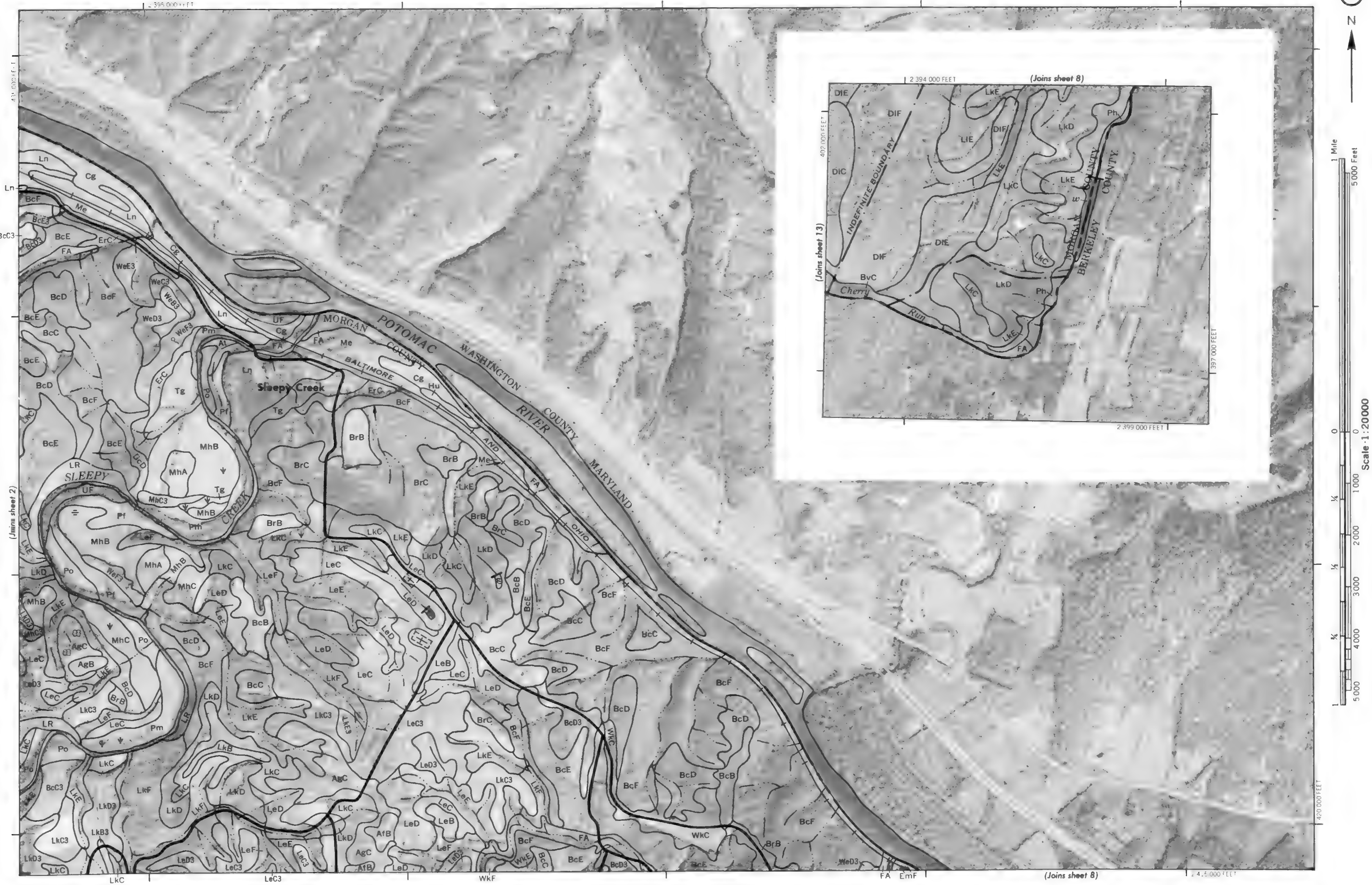
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot, 5 acres or less
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Cut and fill land (C.F.L.)
- Mine dump (M.D.)

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 1

This map is compiled on 1974 aerial photography by the U S Department of Agriculture Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners if shown are approximately positioned


2
N
(Joins inset, sheet 1)
(Joins sheet 1)
(Joins sheet 3)
(Joins sheet 7)
Scale 1:20000
1 Mile
5000 Feet
WASHINGTON COUNTY
MARYLAND
POTOMAC RIVER
MORGAN COUNTY
BALTIMORE AND OHIO
HORSE RIDGE
Hogback Ridge
Alpine Church
Stony Run
Mcinnes Church
DUGAN HOLLOW
PIOUS RIDGE
PIOUS HOLLOW
Fairview Church
Swim Run
CREEK
Spring Run
Dry Run


N
(Joins sheet 2)
(Joins sheet 8)
(Joins sheet 13)
POTOMAC RIVER
MORGAN COUNTY
WASHINGTON COUNTY MARYLAND
BALTIMORE AND OHIO
Sleepy Creek
SLEEPY CREEK
INDEFINITE BOUNDARY
MORGAN COUNTY
BERKELEY COUNTY
Cherry Run
2 394 000 FEET
2 399 000 FEET
402 000 FEET
397 000 FEET
420 000 FEET
1 Mile
5000 Feet
Scale 1:20000
Ln
Cg
Me
BcF
BcE
BcC
BcD
BcC3
ErC
FA
WeE3
WeC3
WeB3
WeD3
WeF3
UF
Pm
Tg
Po
Pf
MhB
MhA
MhC
MhC3
LR
BrB
BrC
LkC
LkE
LkD
LkF
LeC
LeD
LeE
LeF
LeB
AgB
AgC
AfB
WkC
WkE
WkF
Hu
DlE
DlF
DlC
LlE
BvC
Ph
EmF

N

Scale 1:20000

1 Mile

5000 Feet

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 4

2 320 000 FEET

ALLEGANY COUNTY MARYLAND

MORGAN COUNTY

WASHINGTON COUNTY MARYLAND

POTOMAC RIVER

Lineburg

Orleans Cross Roads

Great Cacapon

Great Cacapon Elementary School

SIDELING HILL

BARE RIDGE

Rocky Hollow

Willis Run

Ruchwell Run

Hollow Run

Long Hollow Run

CACAPON RIVER

BALTIMORE AND OHIO

QUARRY

AfB, At, BcC, BcC3, BcD, BcD3, BcE, BcF, BeE3, BkC, BkD, BkF, BoD, BrB, BrC, BuC, CkB, DIC, DIE, DIF, EaC, EaD, EbD3, EbF3, FA, LbC, LbD, LeC, LeD, LkB, LkC, LkC3, LkD, LkD3, LkE, LkF, LkK3, LR, Ln, MhB, MhC, MhC3, OpF, Pm, Pr, Pt, RuF, ShC, ShF, UF, WeC3, WeD3, WeE3, WeF3, WkD, WkE, WkF

(Joins inset, sheet 88)

(Joins sheet 6)

(Joins sheet 11)

2 340 000 FEET

5

N

1 Mile

5000 Feet

Scale 1:20000

N

Scale 1:20000

1 Mile

5000 Feet

(Joins sheet 1)

(Joins sheet 5)

(Joins sheet 7)

(Joins sheet 12)

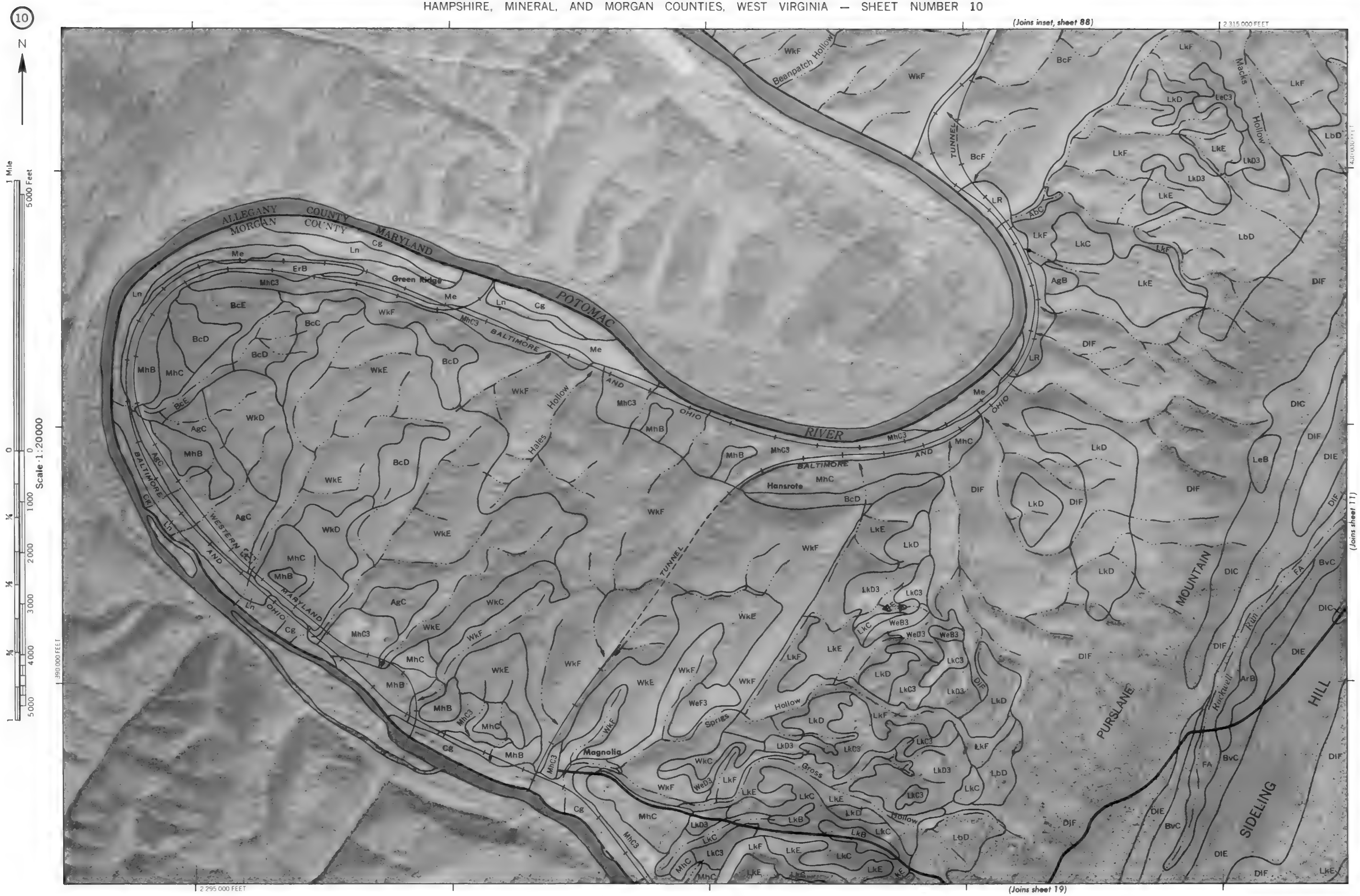
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 6


7
N
(Joins sheet 2)
(Joins sheet 6)
(Joins sheet 8)
(Joins sheet 13)
SLEEPY CREEK PUBLIC
HUNTING AND FISHING AREA
SLEEPY CREEK
INDEFINITE
BOUNDARY
SWIM
HOLLOW
RIDGE
Ridersville
New Hope
Meadow
Branch
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000


8
N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 3)
(Joins sheet 7)
(Joins inset A, sheet 3)
2 395 000 FEET
2 415 000 FEET
POTOMAC
RIVER
BALTIMORE AND OHIO
WASHINGTON COUNTY
MARYLAND
BERKELEY COUNTY
Cherry Run
Cherry Run
SHORT MOUNTAIN
INDEFINITE BOUNDARY
Pleasant View School
Snyders Church
Holton
SLEEPY CREEK PUBLIC
HUNTING AND FISHING AREA


(Joins sheet 4)
2 195 000 FEET
(Joins sheet 15)
(Joins inset B, sheet 14)
(Joins inset A, sheet 14)
(Joins inset A, sheet 4)
Seymour
KNOBLY MOUNTAIN
Buckwheat Hollow
NORTH BRANCH POTOMAC RIVER
ALLEGANY COUNTY
MINERAL COUNTY
MARYLAND
WESTERN MARYLAND
BALTIMORE
Old Furnace Church
Death Valley
Rocky Run
Patterson Creek
Bethel Tabernacle Church
TUNNEL
B AND O
28
N
1 Mile
5000 Feet
Scale 1:20000

9



This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

Scale 1:20000

1 Mile 5000 Feet

0 0

1/4 1000

1/2 2000

3/4 3000

1 4000

5000

MOUNTAIN

PURSLANE

HILL

RIDGE

SIDELING

BARE

RIDGE

ROAD

RIDGE

Hollow

Long Run

Rockwell Run

Trillet Run

Virgins Run

Hollow

Long Run

CACAPON RIVER

TONOLOWAY

CACAPON RIVER

Edes Fort

CACAPON STATE PARK

BOUNDARY INDEFINITE

BOUNDARY INDEFINITE

Mt Nebo Church

FA

(Joins sheet 5)

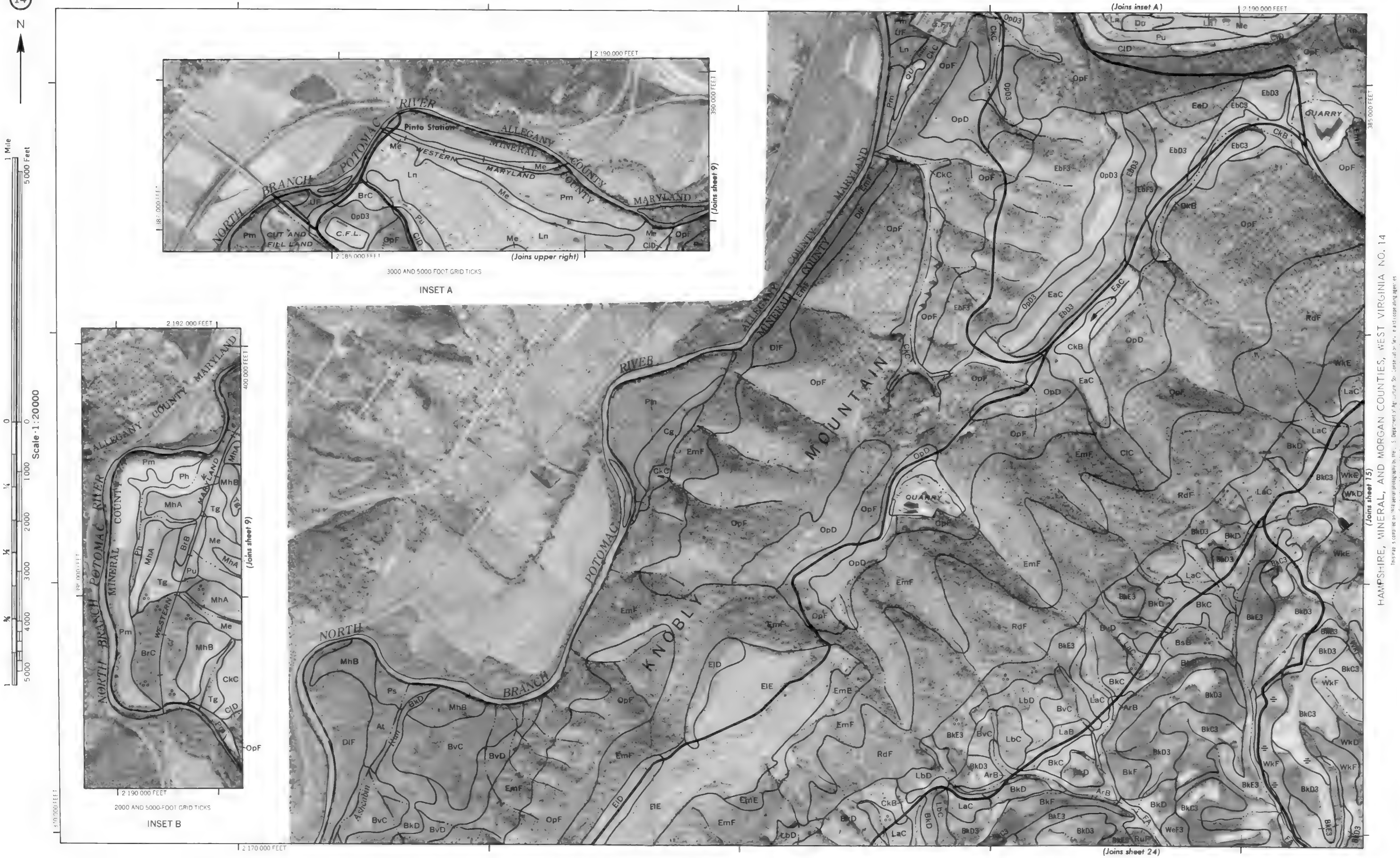
(Joins sheet 12)

(Joins sheet 10)

(Joins sheet 20)


12
N
(Joins sheet 6)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 21)
CACAPON STATE PARK
CACAPON MOUNTAIN
INDEFINITE BOUNDARY
WARM SPRING RIDGE
SLEEPY CREEK
HIGHLAND RIDGE
Mt Pleasant Church
Johnsons Mill
Bethel Church
Water
MARL
522
Scale 1:20000
1 Mile
5000 Feet


13
N
(Joins sheet 7)
New Hope
Spring Run
CREEK
SLEEPY
RIDGE
HIGHLAND
Mountain
Run
Duckwalls Church
(Joins sheet 12)
SLEEPY CREEK PUBLIC HUNTING AND FISHING AREA
Meadow Br.
Cherry Run
(Joins inset, sheet 3)
SLEEPY CREEK MOUNTAIN
MORGAN COUNTY
BERKELEY COUNTY
INDEFINITE BOUNDARY
(Joins sheet 22)
2 370 000 FEET
400 000 FEET
1 Mile
5000 Feet
Scale 1:20000


14
N
1 Mile
5000 Feet
Scale 1:20000
(Joins inset A)
(Joins sheet 15)
(Joins sheet 24)
(Joins sheet 9)
(Joins upper right)
3000 AND 5000 FOOT GRID TICKS
INSET A
2000 AND 5000-FOOT GRID TICKS
INSET B
2 190 000 FEET
2 185 000 FEET
2 192 000 FEET
2 170 000 FEET
385 000 FEET
390 000 FEET
400 000 FEET
NORTH BRANCH POTOMAC RIVER
ALLEGANY COUNTY MARYLAND
MINERAL COUNTY
KNOBLY
MOUNTAIN
QUARRY
Pinto Station
WESTERN MARYLAND
CUT AND FILL LAND
C.F.L.
Ashabin Run
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 14

2 195 000 FEET

(Joins sheet 9)

(Joins sheet 14)

(Joins sheet 16)

(Joins sheet 25)

2 215 000 FEET

370 000 FEET

Short Gap

BALTIMORE AND OHIO

Plum Run

Rocky Plum Run

Turners Run

Myers Run

RIDGE CREEK

PATTERSON CREEK

15

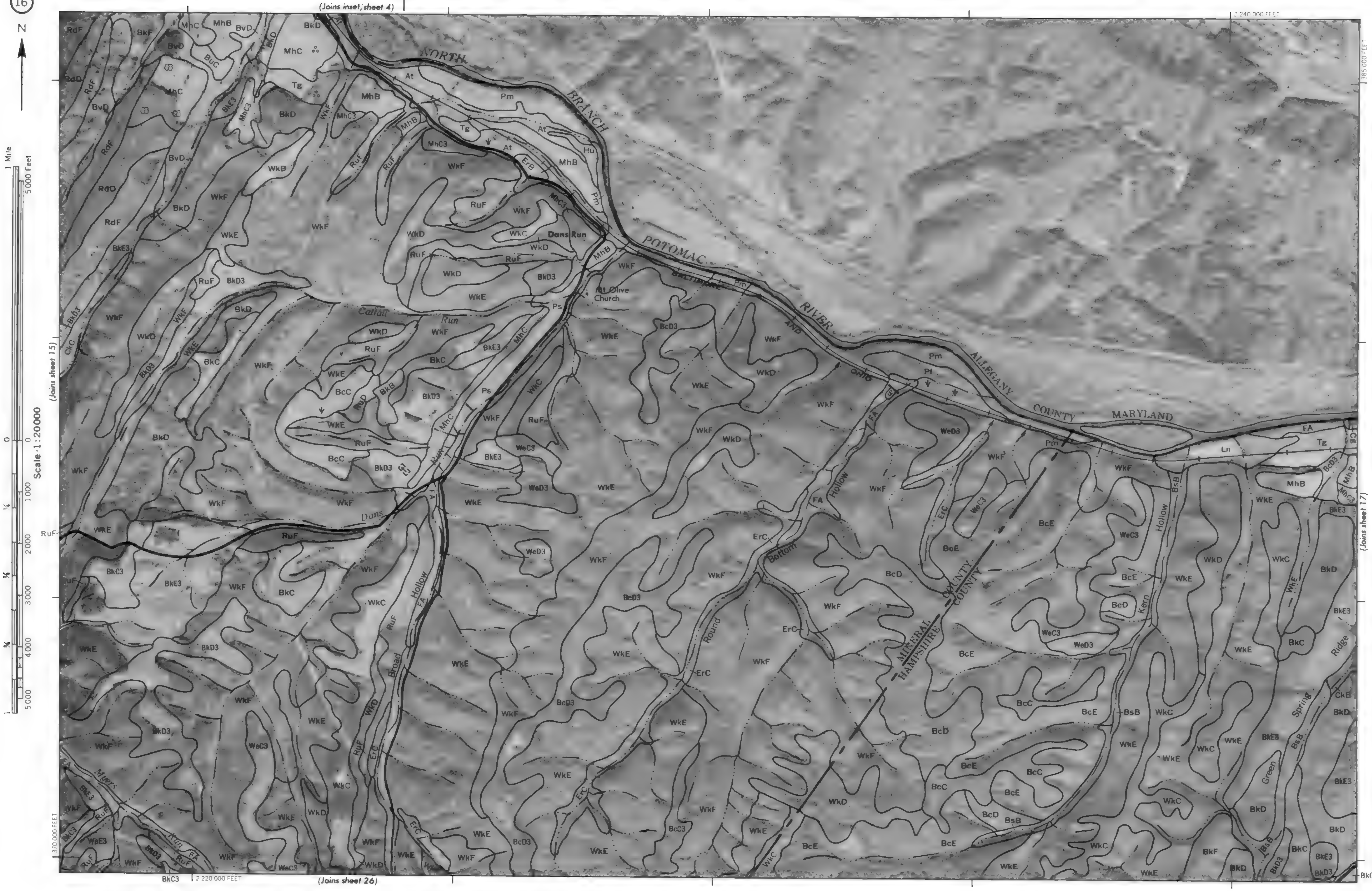
N

1 Mile

5000 Feet

Scale 1:20000

0 0 ¼ 1000 ½ 2000 ¾ 3000 1 4000 5000


N
1 Mile
5000 Feet
Scale 1:20000
(Joins inset, sheet 4)
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 26)
2 240 000 FEET
385 000 FEET
2 220 000 FEET
370 000 FEET
NORTH BRANCH
POTOMAC RIVER
BALTIMORE AND OHIO
ALLEGANY COUNTY
MARYLAND
Dans Run
Mt Olive Church
Cattail Run
Broad Hollow
Round Bottom
Hollow
Kern Hollow
Green Spring Ridge
MINERAL COUNTY
HAMPSHIRE COUNTY
Myers Run

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 17

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NUMBER 18

N

1 Mile
5 000 Feet
Scale 1:20000
0 1000 2000 3000 4000 5000

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

19
N
(Joins sheet 10)
(Joins sheet 18)
(Joins sheet 20)
(Joins sheet 29)
Scale 1:20000
1 Mile
5000 Feet
POTOMAC RIVER
ALLEGANY COUNTY MARYLAND
MORGAN COUNTY
WESTERN MARYLAND
BALTIMORE AND OHIO
Bevan Bend
Paw Paw
Paw Paw Elementary School
Paw Paw High School
Kate Hollow
Paw Paw Ridge
Big Run
Sheer Run
Sharon Run
Stinebaugh Hollow
Stinebaugh Point
Piney Point
SIDELING HILL
SPRING GAP MOUNTAIN
CACAPON RIVER
HAMPSHIRE CO.
water


20
N
(Joins sheet 11)
(Joins sheet 19)
(Joins sheet 21)
(Joins sheet 30)
1 Mile
5000 Feet
Scale 1:20000
2 340 000 FEET
385 000 FEET
2 320 000 FEET
370 000 FEET
TONOLOWAY RIDGE
CACAPON RIVER
CACAPON MOUNTAIN
CACAPON STATE PARK
WARM SPRING RIDGE
Piney Ridge
Constant Run
Connor Hollow
INDEFINITE BOUNDARY
C.F.L.
522
9

N

WARM SPRING RIDGE

TIMBER RIDGE

HIGHLAND RIDGE

SLEEPY CREEK

Sleepy Creek

Middle Fork South Fork Sleepy Creek

Mt Tabor Church

Rock Gap

Ambrose Chapel

Highland Church

Mt Olivet Church

C.F.L.

522

(Joins sheet 12)

(Joins sheet 20)

(Joins sheet 22)

(Joins sheet 31)

1 Mile

5000 Feet

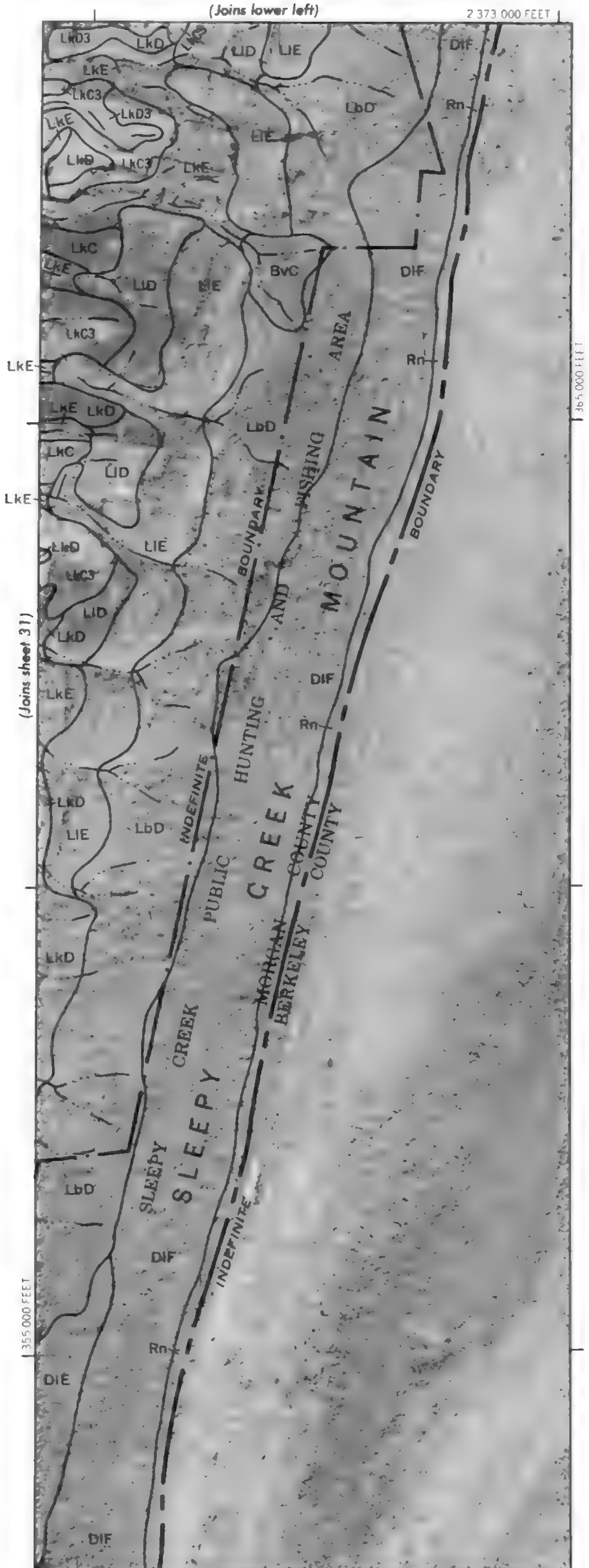
Scale 1:20000

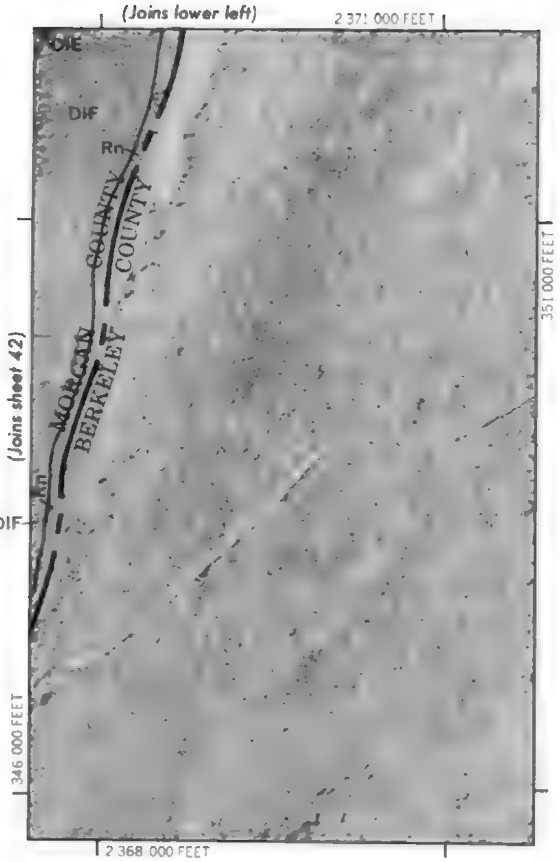
(22)

N

Scale 1:20000

1 Mile — 5000 Feet





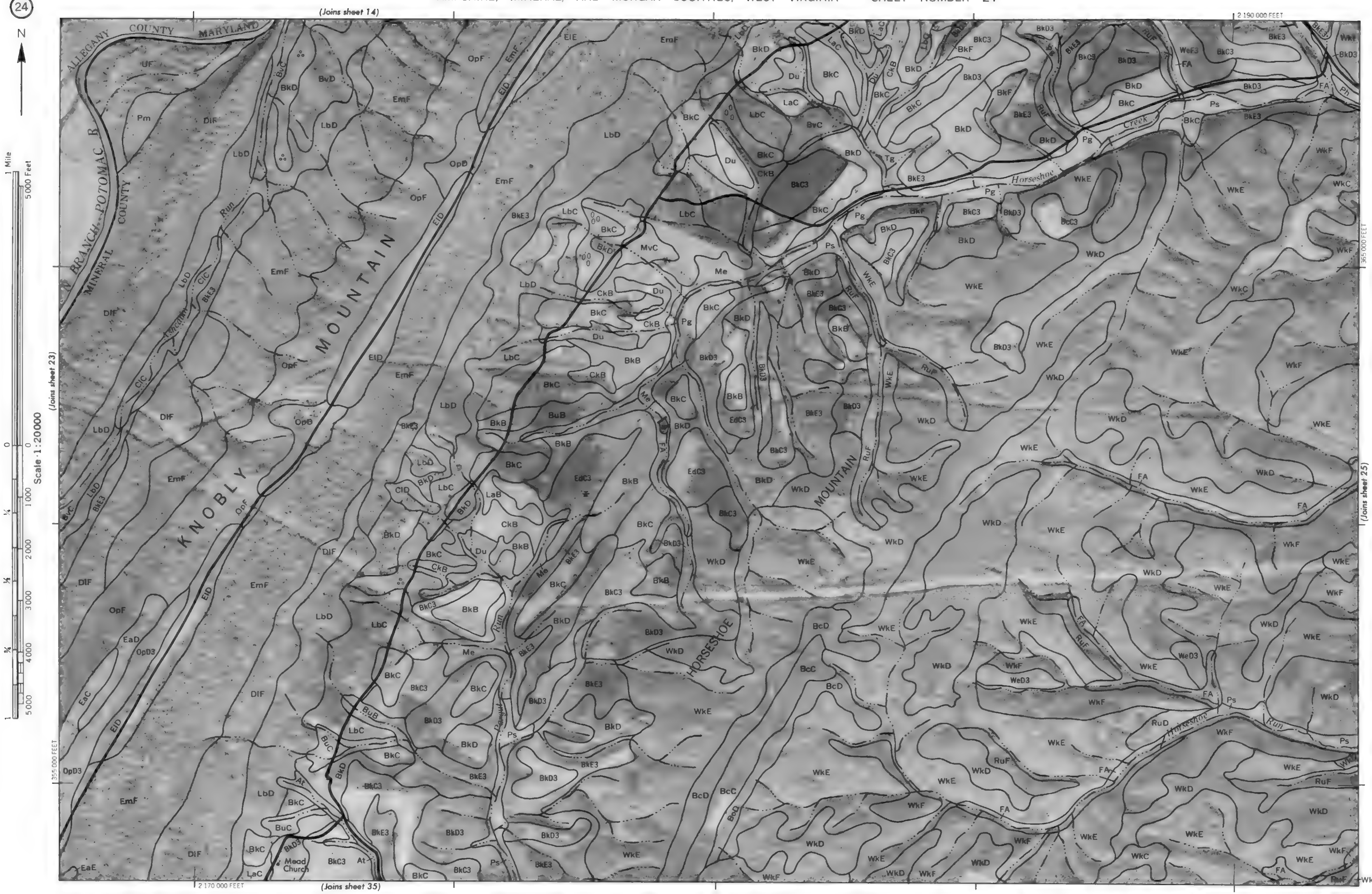
INSET B

3000 AND 5000-FOOT GRID TICKS

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 23

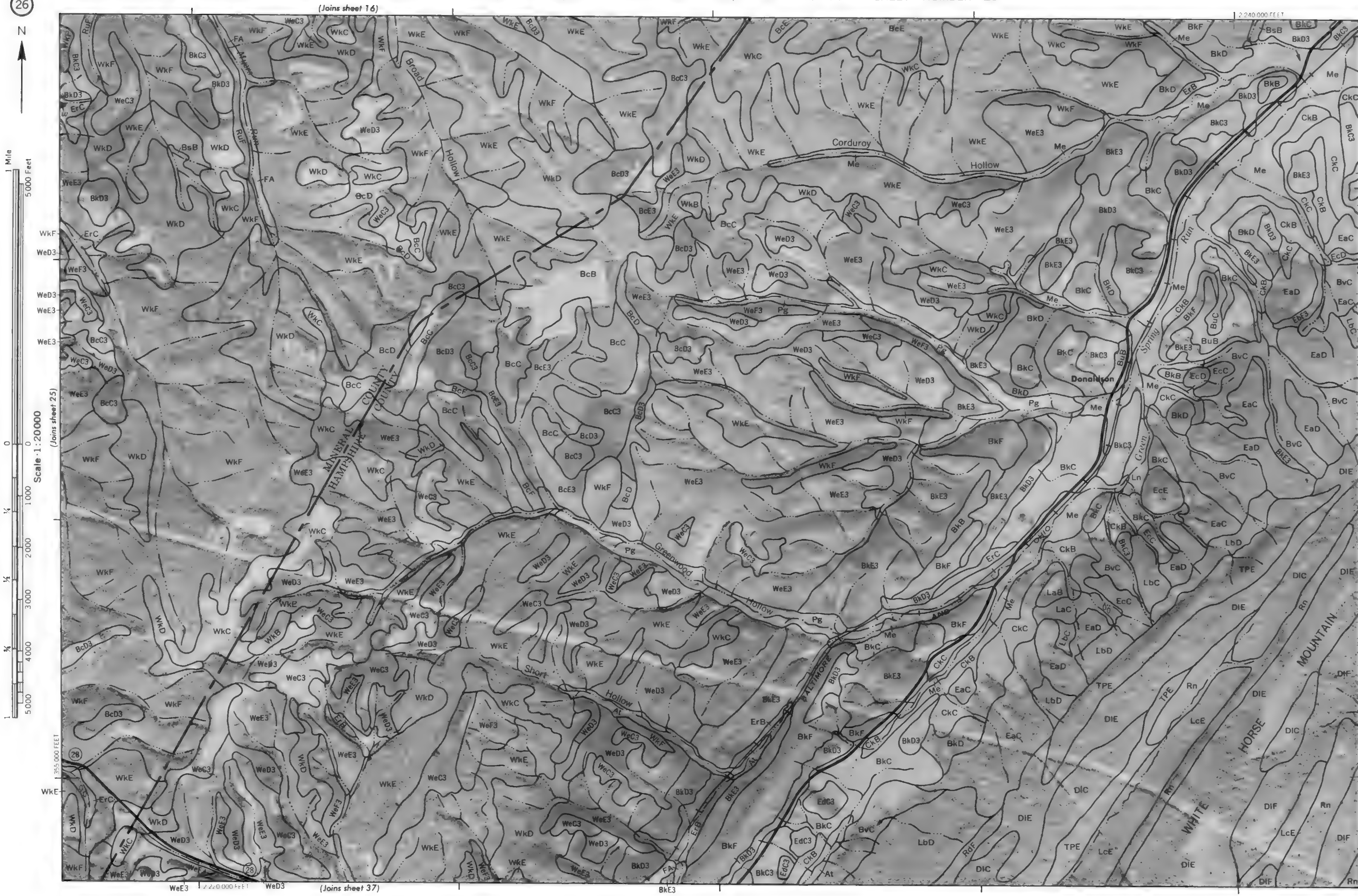
This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



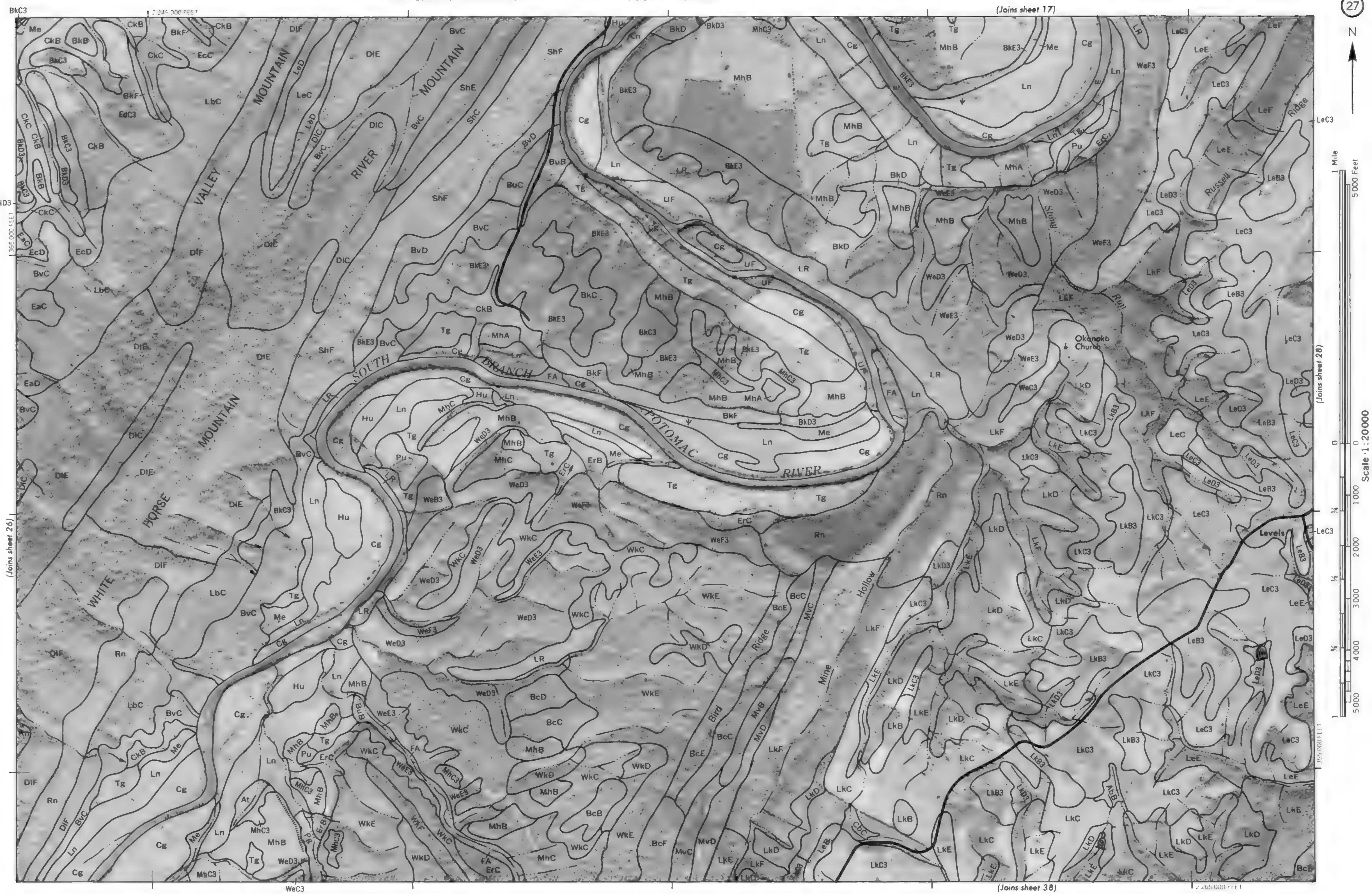
This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 24

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 25



HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 26



HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 27

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 28

N

(Joins sheet 19)

(Joins sheet 28)

(Joins sheet 40)

(Joins sheet 30)

SPRING GAP MOUNTAIN

SIDELING HILL

CACAPON MOUNTAIN

LITTLE CACAPON MOUNTAIN

MORGAN COUNTY

HAMPSHIRE COUNTY

CACAPON RIVER

Stoney Creek

Run

Eubulus Church

Largent

Scale 1:20000

1 Mile

5000 Feet

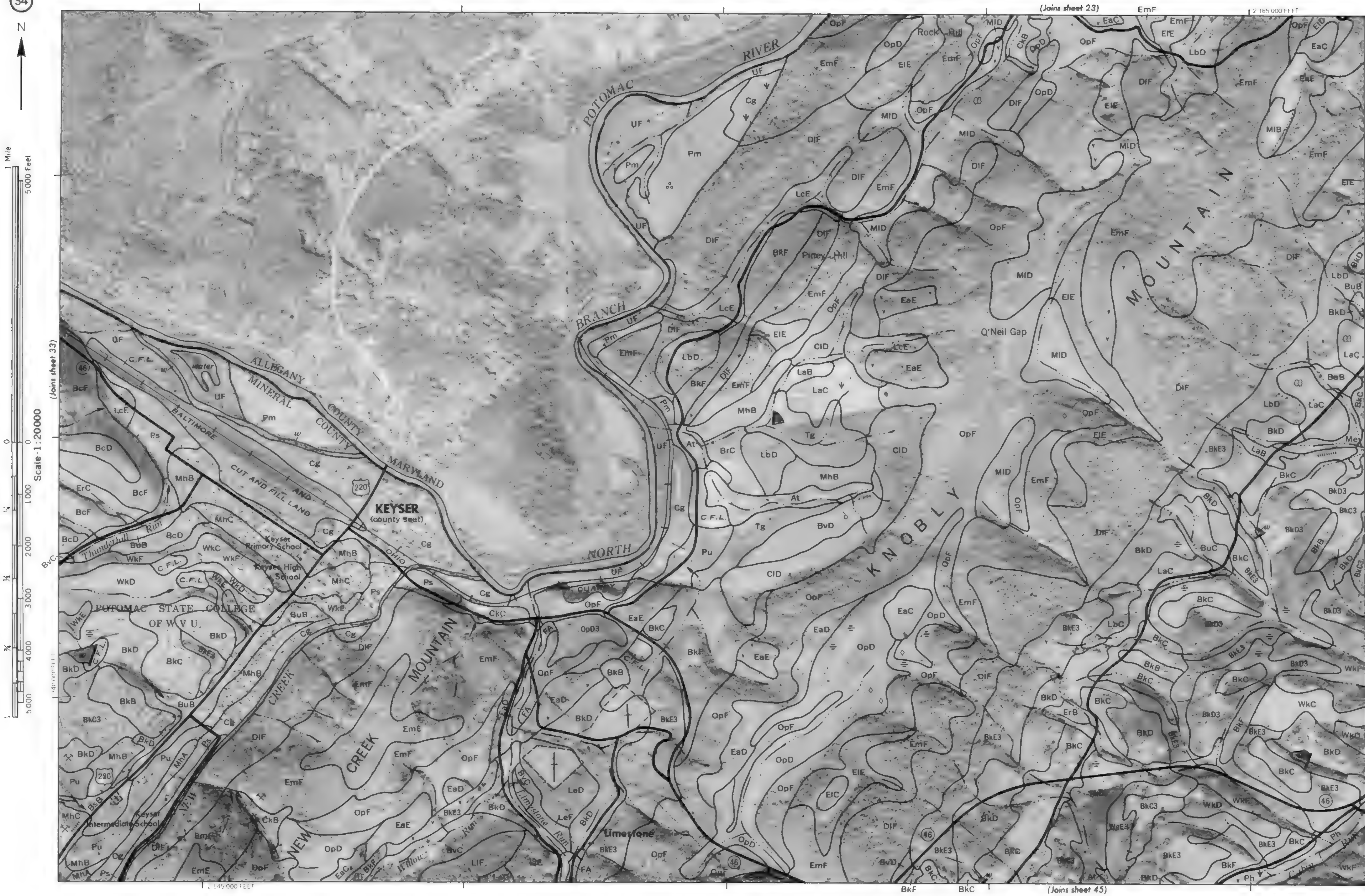
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 30


(Joins sheet 21)
(Joins sheet 30)
(Joins sheet 42)
(Joins inset A, sheet 22)
Oakland
Greenwood Elementary School
TIMBER RIDGE
Indian Run
Creek
Fork
Run
Hollow
INDEFINITE BOUNDARY
N
1 Mile
5000 Feet
Scale 1:20000


N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
(Joins inset B, sheet 23)
2 115 000 FEET
350 000 FEET
(Joins sheet 33)
(Joins sheet 43)
2 095 000 FEET
340 000 FEET
2 090 000 FEET
325 000 FEET
320 000 FEET
2 085 000 FEET
(Joins sheet 54)
(Joins sheet 43)
NORTH BRANCH POTOMAC RIVER
MARYLAND
GARRETT COUNTY
MINERAL COUNTY
WESTERN MARYLAND
Potomac Manor
Blaine
Warnocks
Barnum
C.F.L.
42
46
Ps
UF
GmF
GmC
BvC
BvD
GlB
GlC
GlE
ErB
ArB
WoC
WnC
WnB
WaC
SM
LcE
TPC
FA
Es

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 33

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

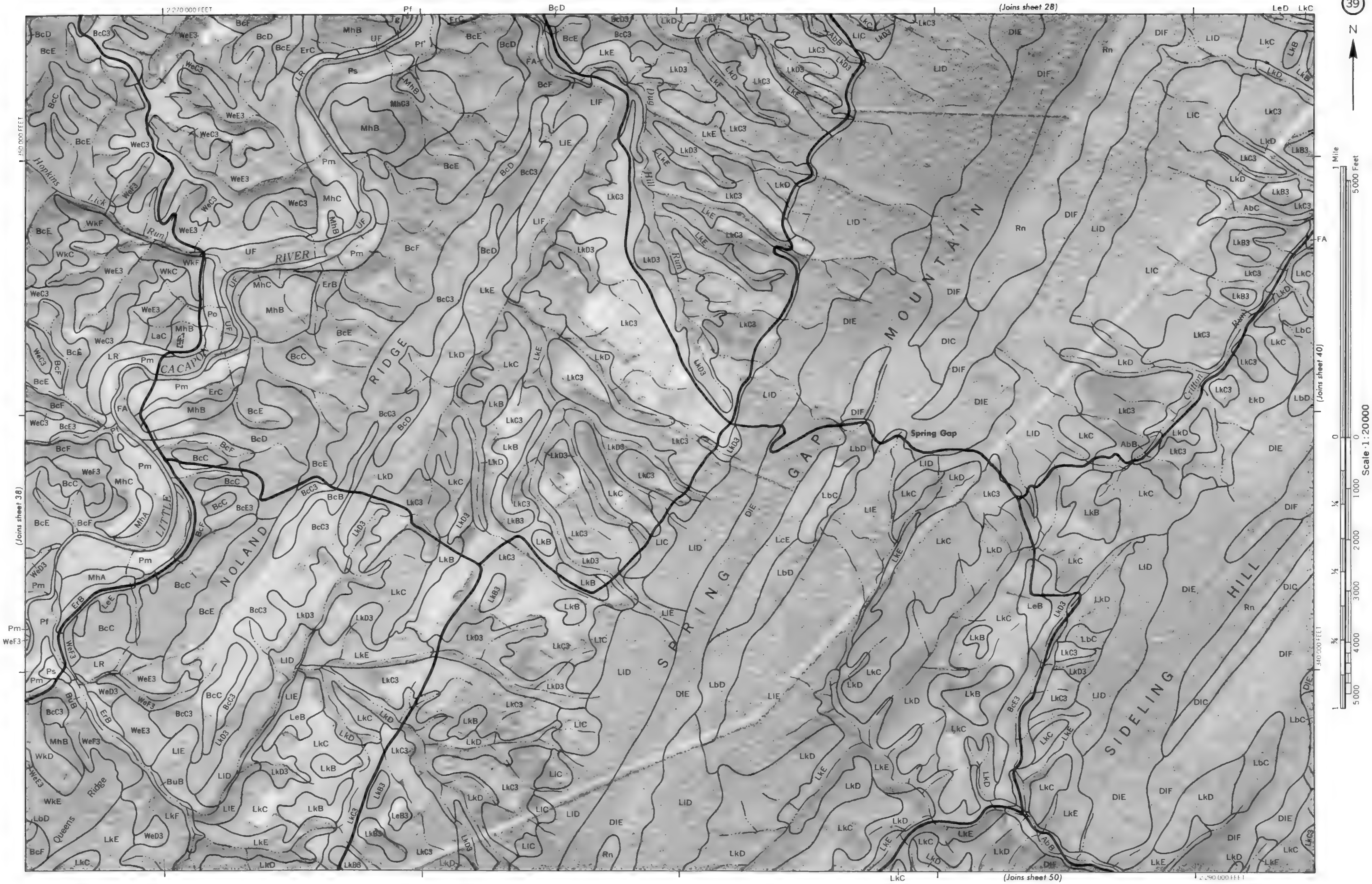

N
Scale 1:20000
1 Mile
5000 Feet
(Joins sheet 23)
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 45)
2 165 000 FEET
2 145 000 FEET
350 000 FEET
POTOMAC RIVER
NORTH BRANCH
ALLEGANY COUNTY MARYLAND
MINERAL COUNTY
BALTIMORE AND OHIO
CUT AND FILL LAND
KEYSER
(county seat)
Keyser Primary School
Keyser High School
Keyser Intermediate School
POTOMAC STATE COLLEGE OF W V U
Thunderhill Run
NEW CREEK MOUNTAIN
NEW CREEK
KNOBLY MOUNTAIN
Piney Hill
Rock Hill
O'Neil Gap
Limestone
Limestone Run
Willow Run
Curtis Run
QUARRY
water
220
46

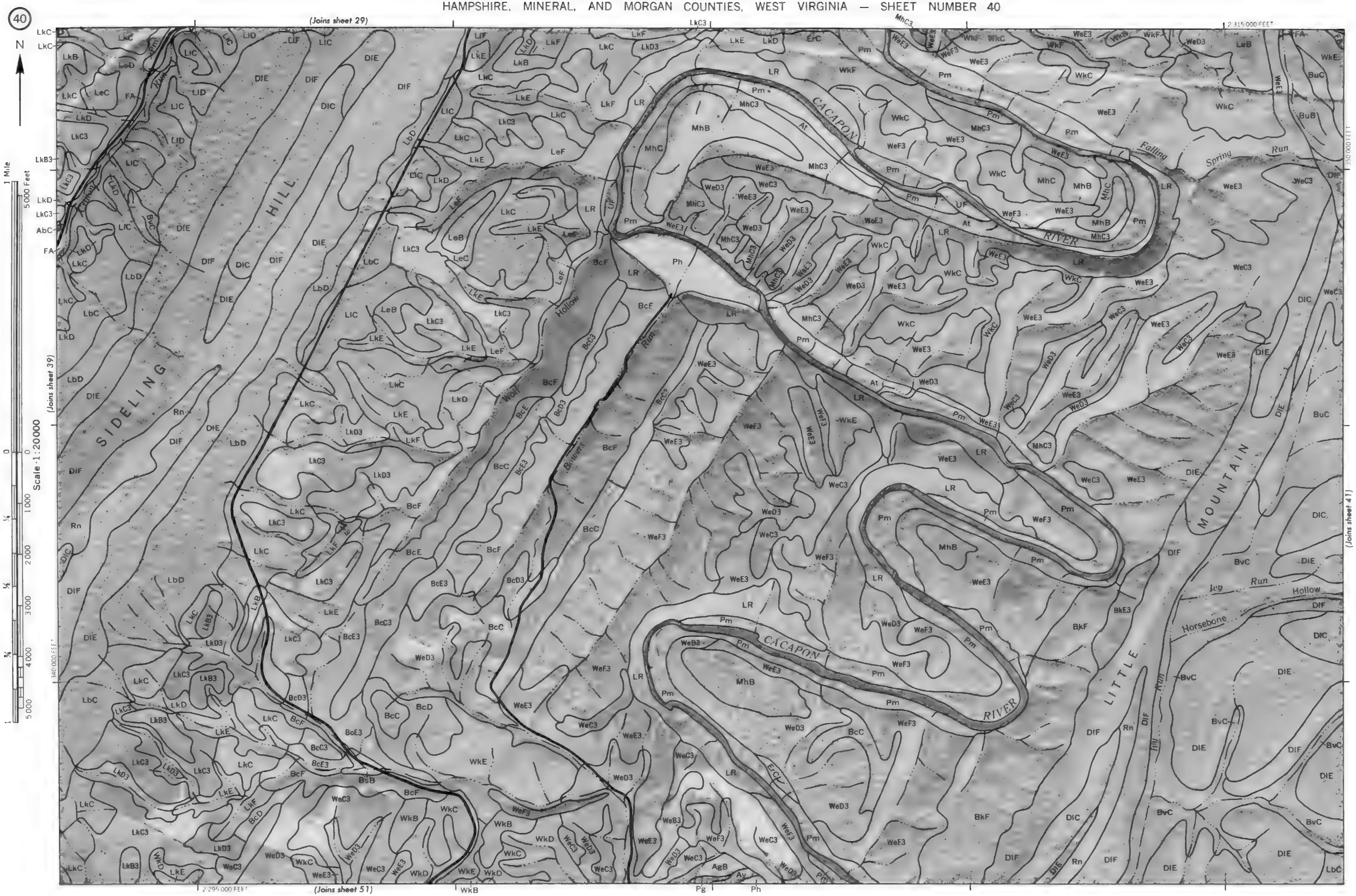
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NUMBER 35


36
N
(Joins sheet 25)
(Joins sheet 35)
(Joins sheet 37)
(Joins sheet 47)
2 215 000 FEET
2 195 000 FEET
350 000 FEET
340 000 FEET
1 Mile
5000 Feet
Scale 1:20000
PATTERSON CREEK
PATTERSON CREEK MOUNTAIN
MIDDLE RIDGE
BUCK RIDGE
MINERAL COUNTY
HAMPSHIRE COUNTY
Kellar Run
Mill Run
Palmer Run
Rinehart Run
Sugarcamp Run
Johns Run
Broad Run
Hazel Run
46


37
N
(Joins sheet 26)
(Joins sheet 36)
(Joins sheet 38)
(Joins sheet 48)
2 220 000 FEET
350 000 FEET
340 000 FEET
2 240 000 FEET
Springfield
Springfield Elementary & School
Raven Rocks
Millesons Mill
Grace
Blues Beach
Ritters
BUCK RIDGE
BALTIMORE AND OHIO
Springfield Valley
Johns Run
POTOMAC RIVER
SOUTH BRANCH
1 Mile
5000 Feet
Scale 1:20000


38
N
(Joins sheet 27)
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 49)
1 Mile
5000 Feet
Scale 1:20000
2 265 000 FEET
350 000 FEET
340 000 FEET
2 245 000 FEET
SOUTH BRANCH MOUNTAIN
TOWN HILL
Hopkins
Lick
Run
CACAPON
RIVER
LITTLE
John J Cornwall Elementary School
Wesley Chapel
Points
Mine
Hollow
Birch
Hollow
water
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 38


39
N
(Joins sheet 28)
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 50)
2 270 000 FEET
250 000 FEET
2 290 000 FEET
340 000 FEET
Hopkins
Lick
Run
RIVER
CACAPON
LITTLE
NOLAND
RIDGE
Queens
Ridge
Hill
Run
SPRING
GAP
MOUNTAIN
Spring Gap
SIDELING
HILL
Critton
Run
Scale 1:20000
1 Mile
5000 Feet


40
N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 29)
(Joins sheet 39)
(Joins sheet 41)
(Joins sheet 51)
2 295 000 FEET
2 315 000 FEET
350 000 FEET
340 000 FEET
SIDELING
HILL
CACAPON
RIVER
Falling
Spring
Run
Wolf
Hollow
Bowers
Run
LITTLE
MOUNTAIN
Ivy
Run
Hollow
Horsebone
Ivy
Run

(Joins sheet 30)

(Joins sheet 40)

(Joins sheet 42)

(Joins sheet 52)

N

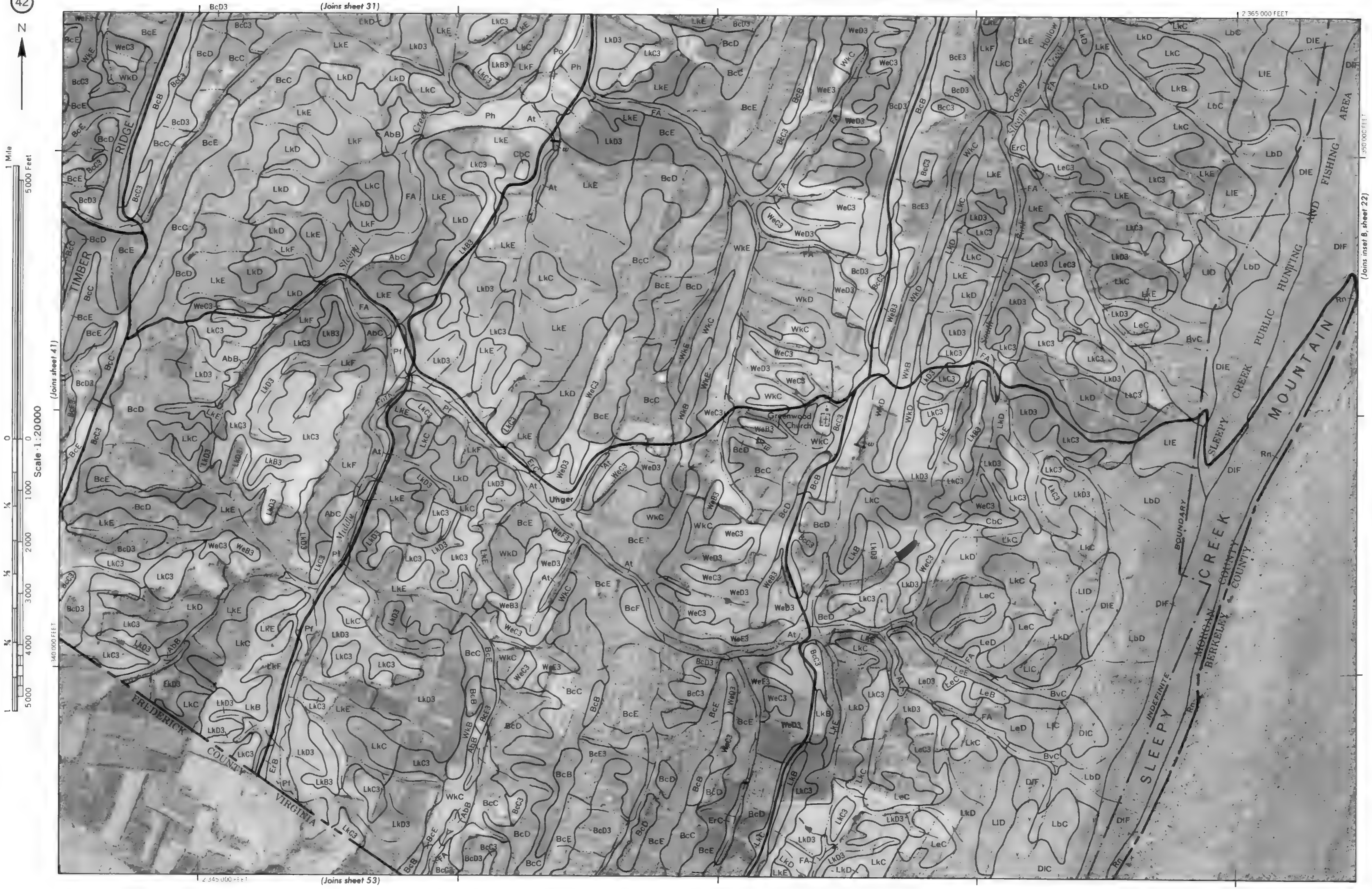
1 Mile ¼ ½ ¾ 0 1

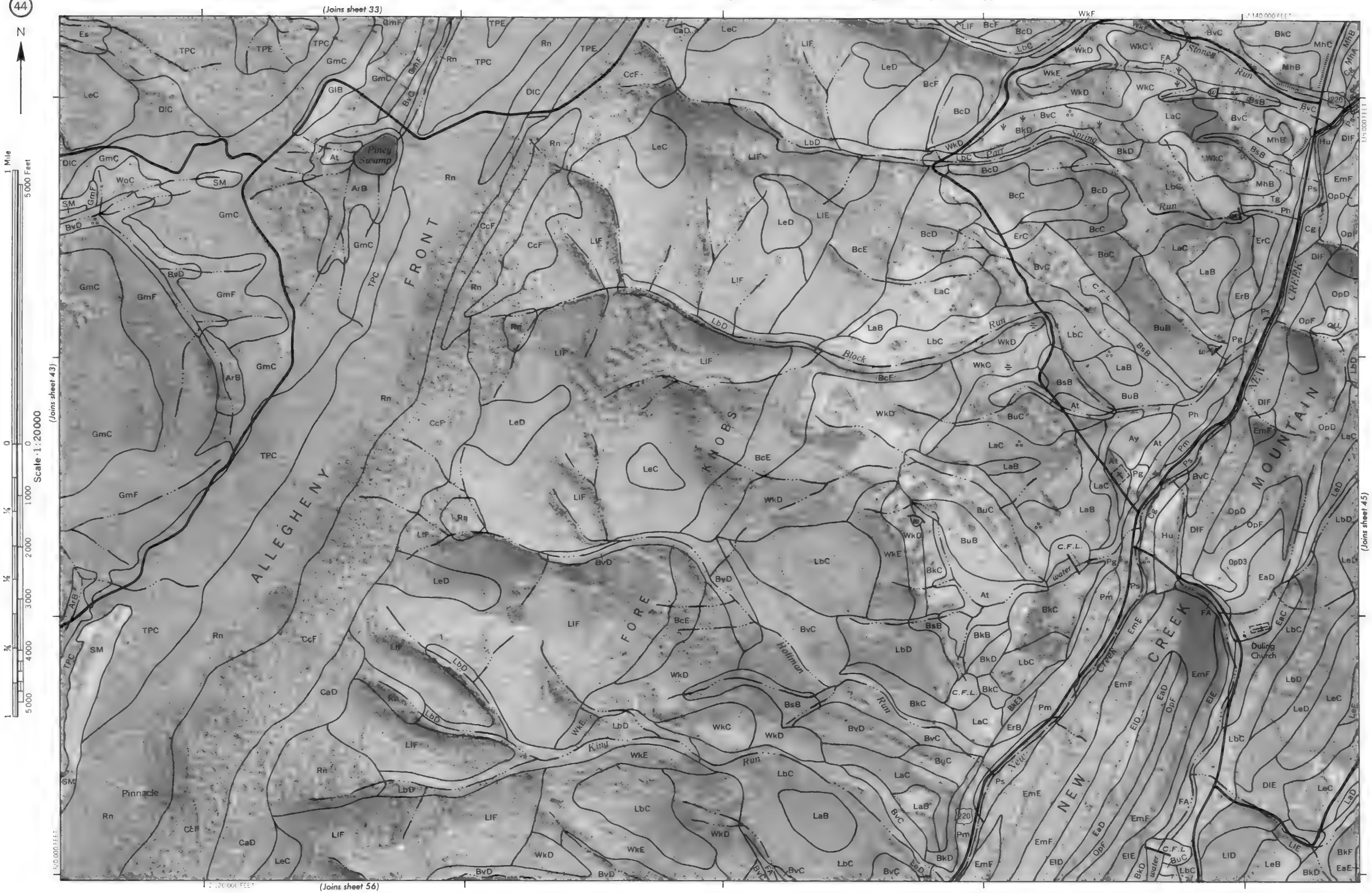
5000 Feet 4000 3000 2000 1000 0 5000

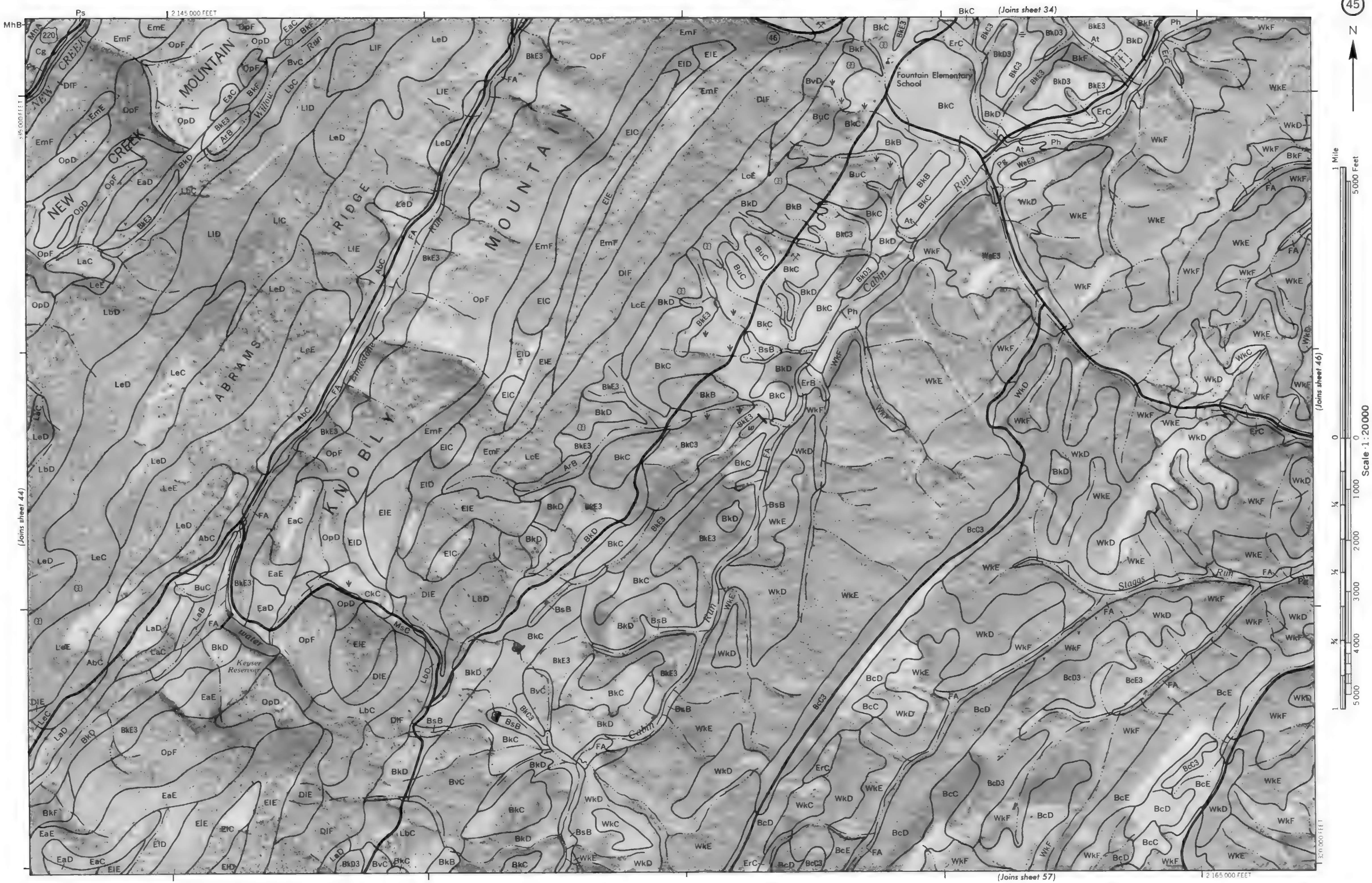
Scale 1:20000

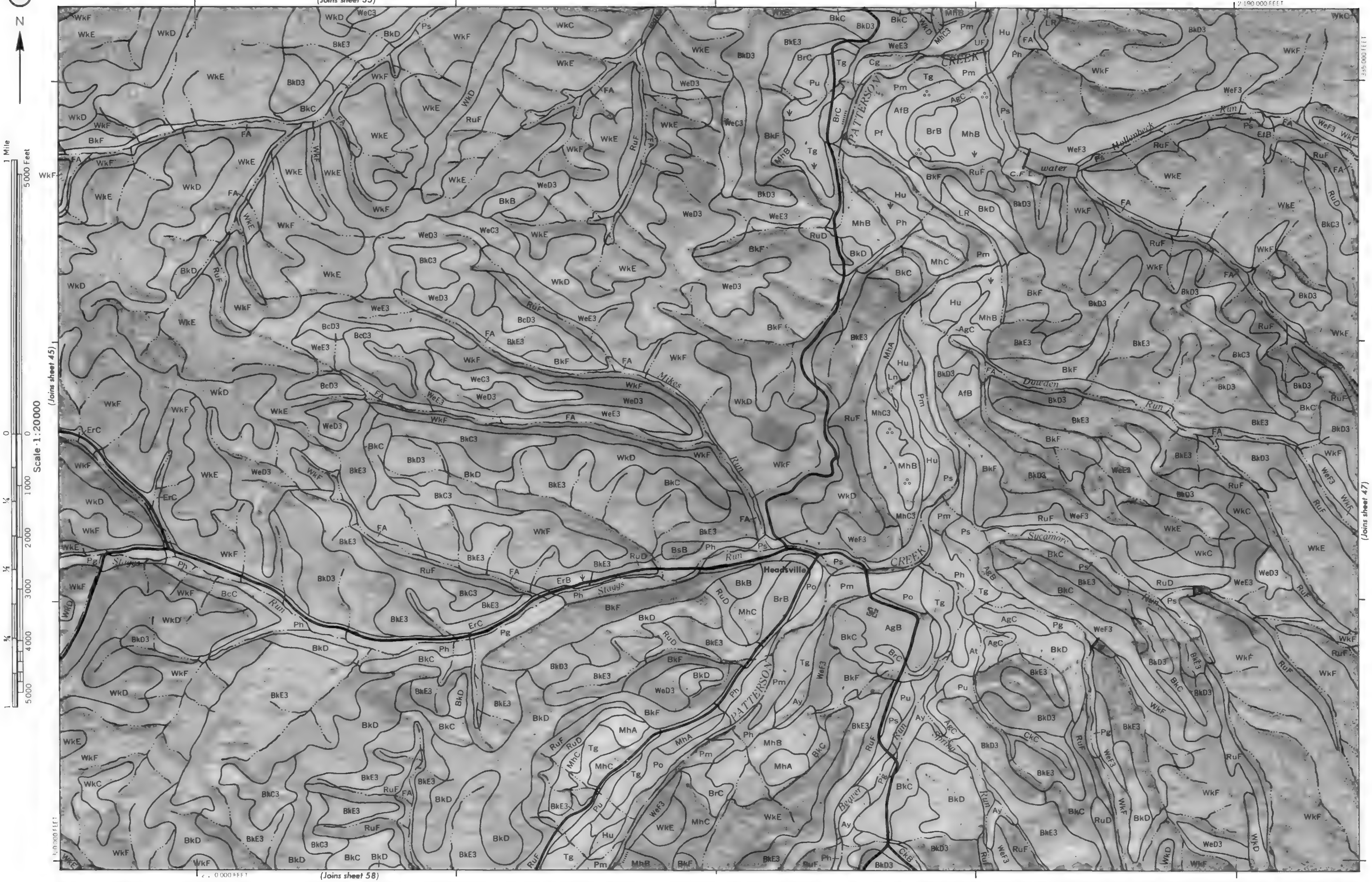
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 41

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

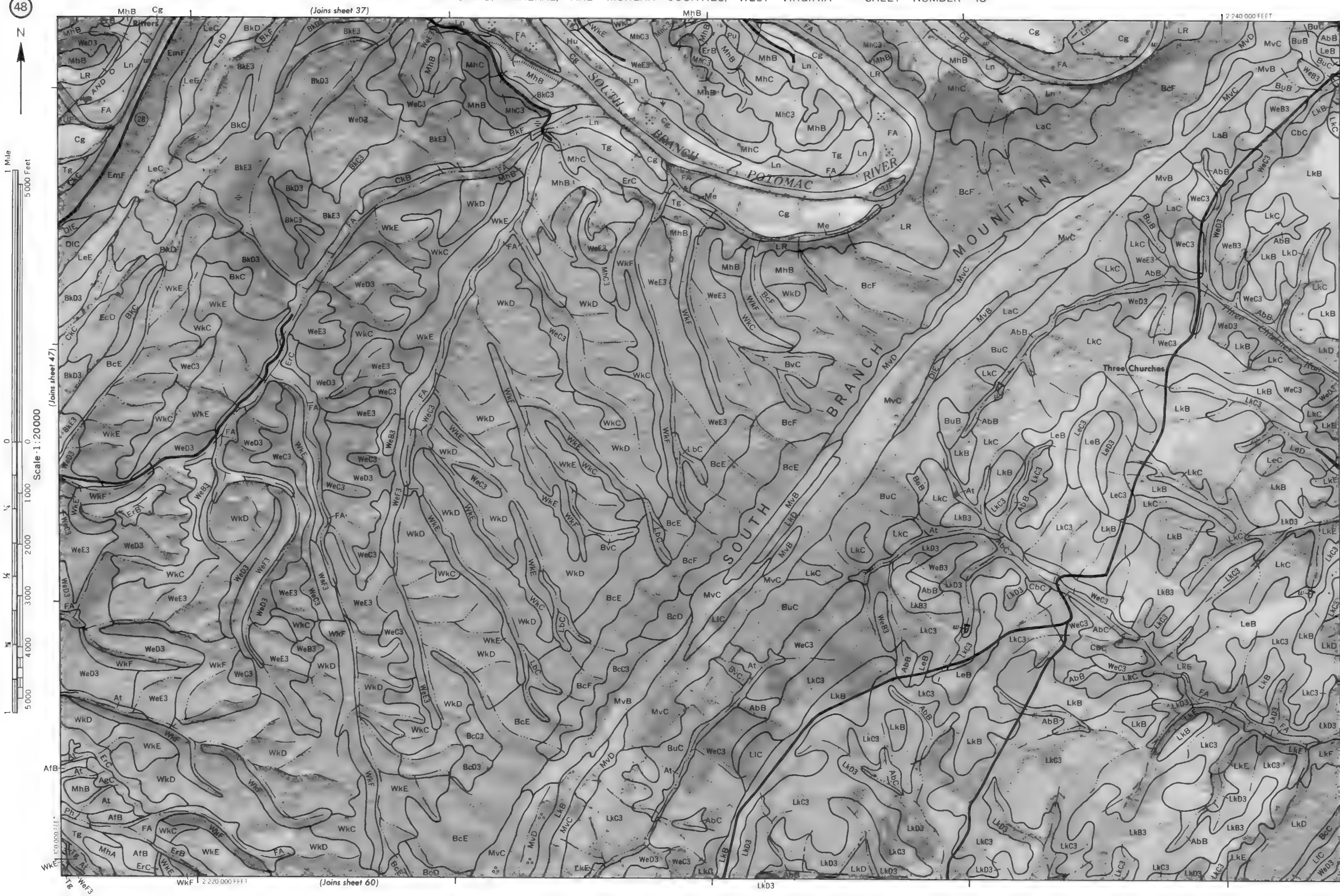

42
N
(Joins sheet 31)
(Joins sheet 53)
(Joins sheet 41)
(Joins inset B, sheet 22)
1 Mile
5000 Feet
Scale 1:20000
2 365 000 FEET
2 345 000 FEET
350 000 FEET
340 000 FEET
TIMBER RIDGE
Greenwood Church
Unger
FREDERICK COUNTY
VIRGINIA
SLEEPY CREEK PUBLIC HUNTING AND FISHING AREA
SLEEPY CREEK MOUNTAIN
INDEFINITE BOUNDARY
MORGAN COUNTY
BERKELEY COUNTY
SLEEPY CREEK
Posey Hollow


44
N
(Joins sheet 33)
(Joins sheet 43)
(Joins sheet 45)
(Joins sheet 56)
Scale 1:20000
1 Mile
5000 Feet
ALLEGHENY FRONT
FORE KNOBS
NEW CREEK MOUNTAIN
NEW CREEK
New Creek
Piney Swamp
Pinnacle
Stoney Run
Spring Run
Block Run
Hollman Run
King Run
Duling Church
220
C.F.L.
water

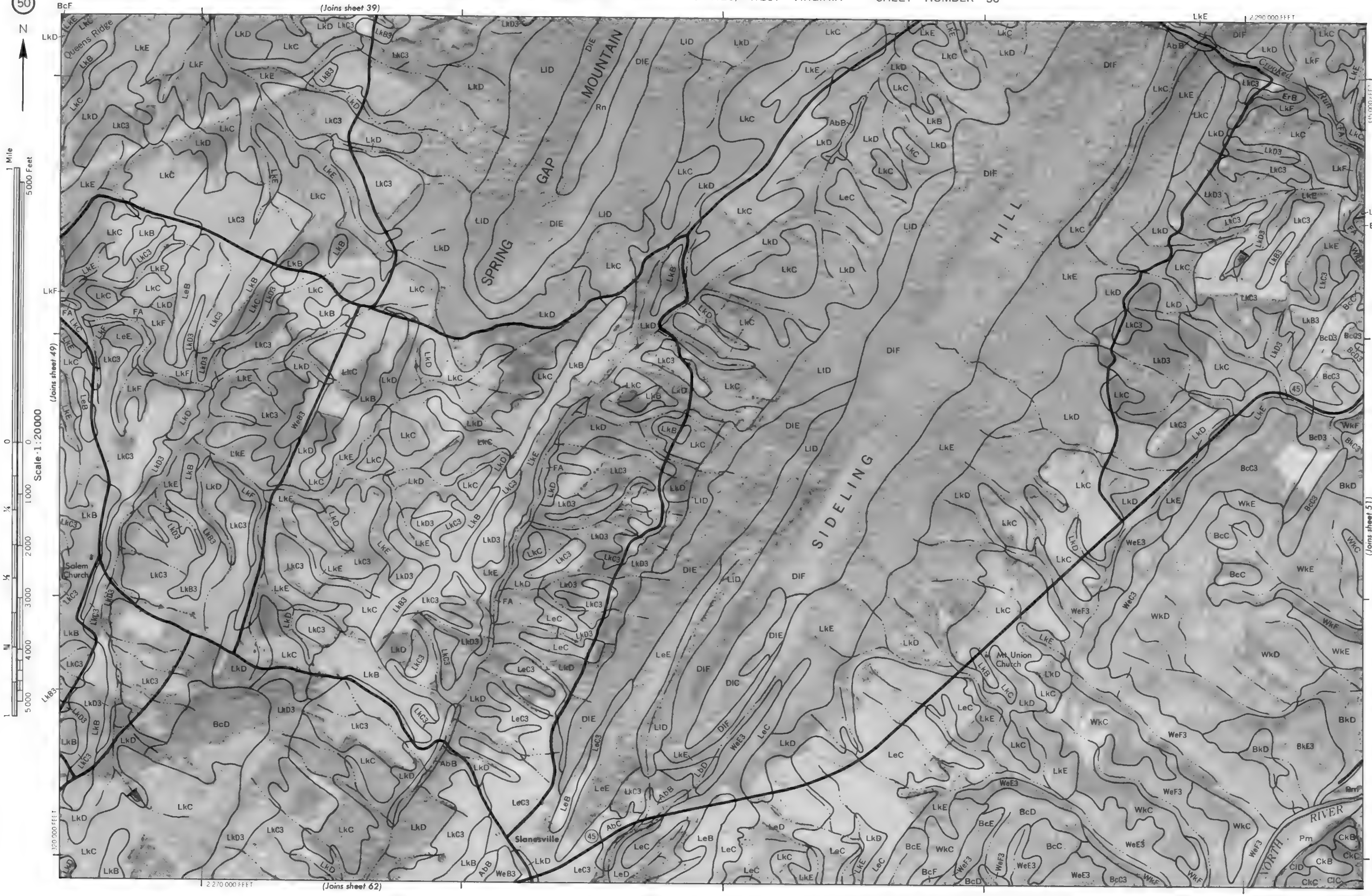

45
N
(Joins sheet 34)
(Joins sheet 44)
(Joins sheet 46)
(Joins sheet 57)
2 145 000 FEET
2 165 000 FEET
NEW CREEK MOUNTAIN
NEW CREEK
ABRAMS
KNOBLY RIDGE
KNOBLY MOUNTAIN
Willow Run
Limestone Run
Fountain Elementary School
Cabin Run
Staggs Run
Keyser Reservoir
water
1 Mile
5000 Feet
Scale 1:20000


N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 35)
(Joins sheet 45)
(Joins sheet 47)
(Joins sheet 58)
2 190 000 FEET
PATTERSON
CREEK
Hollenbeck
Run
water
Mikes
Run
Dowden
Run
Sycamore
Run
Staggs
Run
Headsville
Beaver
Run
Spring

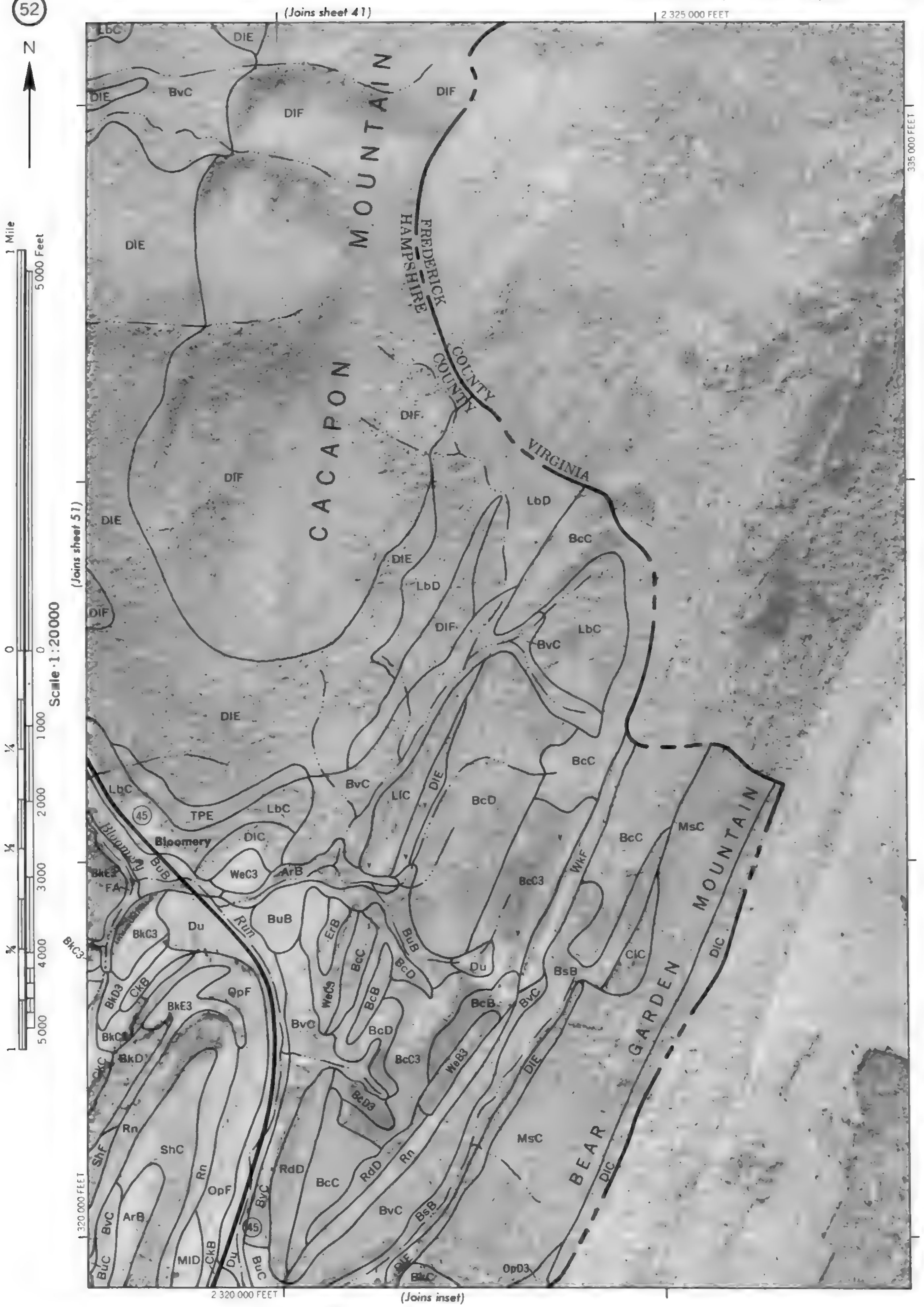

LR (Joins sheet 36)
(Joins sheet 46)
(Joins sheet 48)
(Joins sheet 59)
PATTERSON CREEK MOUNTAIN
MINERAL COUNTY
HAMPSHIRE COUNTY
MILL CREEK MOUNTAIN
SOUTH BRANCH POTOMAC RIVER
Broad Run
Long Run
Allen Run
Fox Run
Ridgedale
Wapocomo
BALTIMORE AND OHIO
N
1 Mile
5000 Feet
Scale 1:20000


48
N
(Joins sheet 37)
(Joins sheet 47)
(Joins sheet 49)
(Joins sheet 60)
SOUTH BRANCH POTOMAC RIVER
SOUTH BRANCH MOUNTAIN
Three Churches
Three Churches Run
Scale 1:20000
1 Mile
5000 Feet
2 240 000 FEET
2 220 000 FEET


(Joins sheet 38)
(Joins sheet 48)
(Joins sheet 50)
(Joins sheet 61)
Higginsville
TOWN HILL
Birch Hollow
CACAPON RIVER
LITTLE CACAPON
CACAPON MOUNTAIN
Queens Ridge
Crooked Run
Three Churches Run
N
Scale 1:20000
1 Mile
5000 Feet
2 245 000 FEET
2 265 000 FEET


50
N
(Joins sheet 39)
(Joins sheet 49)
(Joins sheet 51)
(Joins sheet 62)
SPRING GAP MOUNTAIN
SIDELING HILL
Queens Ridge
Crooked Run
Salem Church
Mt Union Church
Slanesville
NORTH RIVER
45
Scale 1:20000
1 Mile
5000 Feet
2 290 000 FEET
2 270 000 FEET
320 000 FEET
335 000 FEET


51
N
(Joins sheet 40)
(Joins sheet 50)
(Joins sheet 52)
(Joins sheet 63)
Fork of Cacapon
Island Hill Church
Castle Rock
CACAPON RIVER
NORTH RIVER
PINE MOUNTAIN
Castle Mountain
Little Mountain
Crooked Run
Bloomery Run
Ivy Run
Castle Run
1 Mile
5000 Feet
Scale 1:20000
2 315 000 FEET
320 000 FEET
335 000 FEET

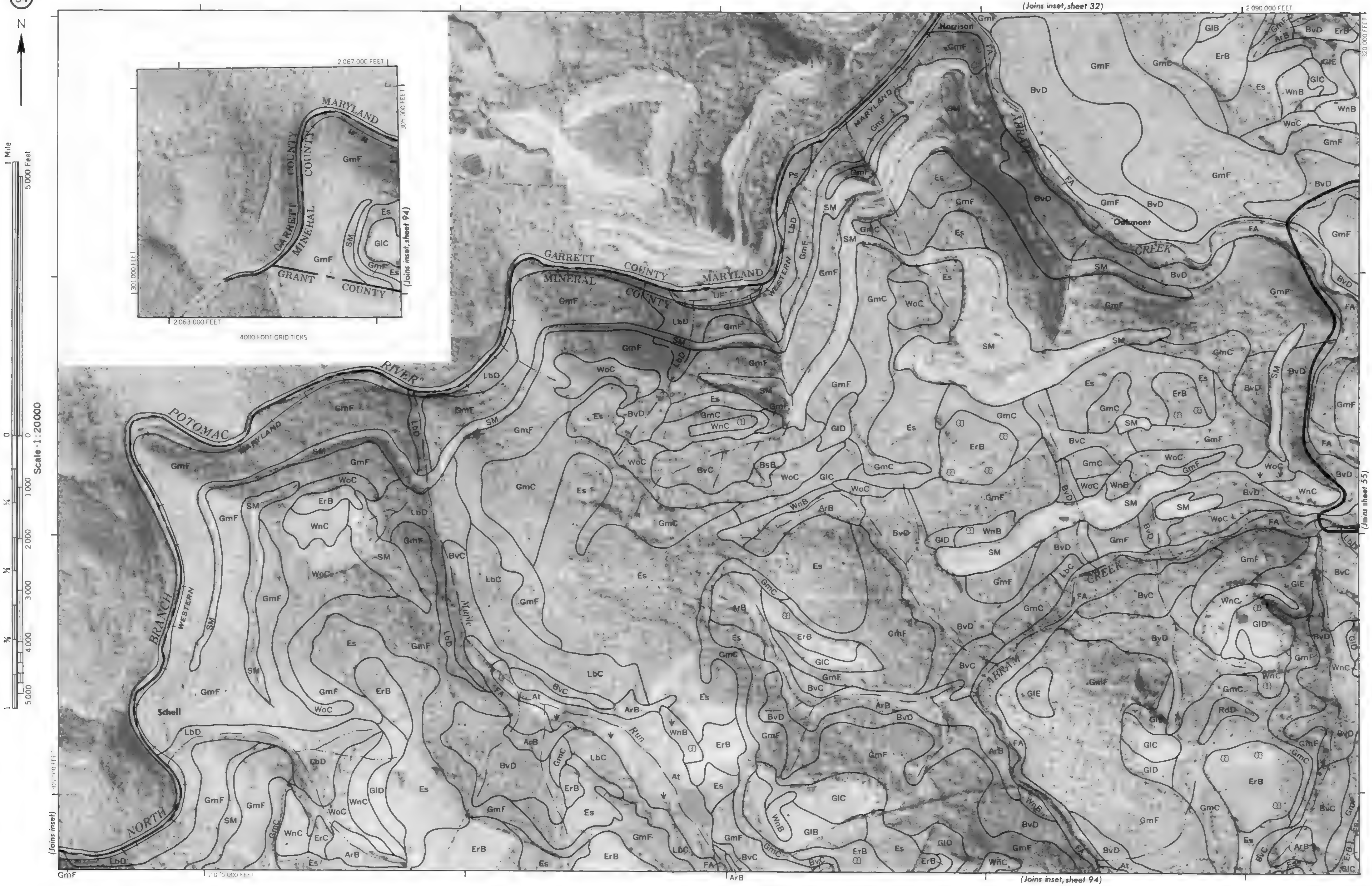


HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 52

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NUMBER 53

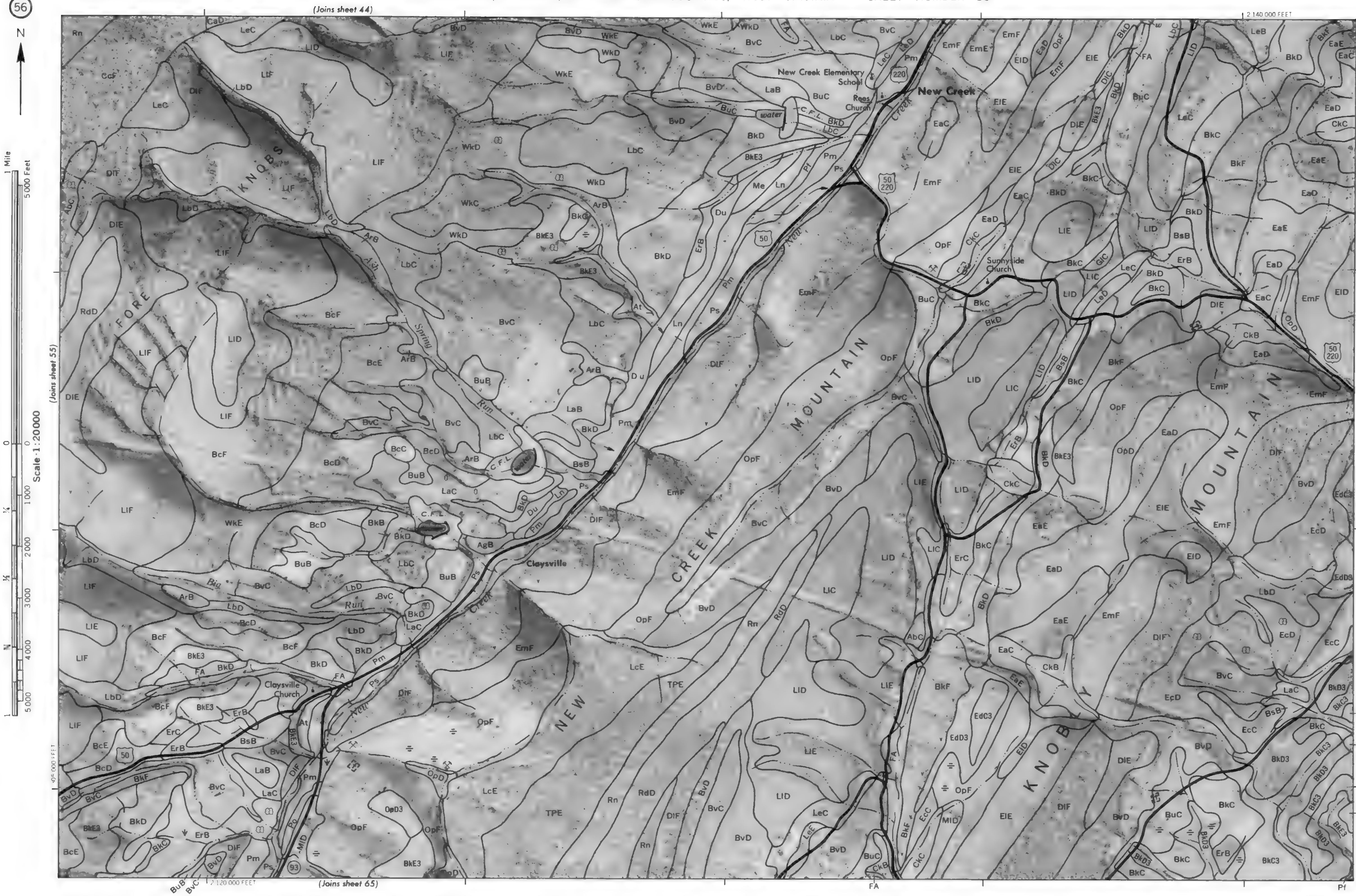
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 53

This map was compiled on 1974 aerial photography by the U S Department of Agriculture Soil Conservation Service and cooperating agencies
Coordinate grid ticks and division corners if shown are approximately adjusted



This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


55
N
(Joins sheet 43)
(Joins sheet 54)
(Joins sheet 56)
(Joins sheet 64)
2 095 000 FEET
2 115 000 FEET
320 000 FEET
305 000 FEET
Nethkin Hill
Nethkin Church
No 7 Hill
Emoryville
Sulphur City
Black Rock
Cranberry Run
Dry Run
Big Run
Emory Creek
ALLEGHENY FRONT
KNOBS
FORE
42
50
1 Mile
5000 Feet
Scale 1:20000
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 55



HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 56


(Joins sheet 45)
(Joins sheet 56)
(Joins sheet 58)
(Joins sheet 66)
2 145 000 FEET
2 165 000 FEET
N
Scale 1:20000
1 Mile
5000 Feet
KNOBLY MOUNTAIN
Ridgeville
Markwood
Burlington
Burlington Elementary School
Mill Creek
Dry Run
Johnson Run
Whites Run
Patterson Creek
Sugar Run
Cabin Run
Lillie Run
Parrill Run
C.F.L.
50
220

58

N

(Joins sheet 46)

2 190 000 FEET

(Joins sheet 57)

Scale 1:20000

1 Mile 5000 Feet

0 ¼ ½ ¾ 1

1 000 0 1 000 2 000 3 000 4 000 5 000

2 170 000 FEET

(Joins sheet 67)

(Joins sheet 59)

PATTERSON CREEK MOUNTAIN

MINERAL COUNTY
HAMPSHIRE COUNTY

Patterson Creek

Johnson Run

Mud Run

Reuter Run

Spring Run

Long Meadow Run

Sugar Run

Run

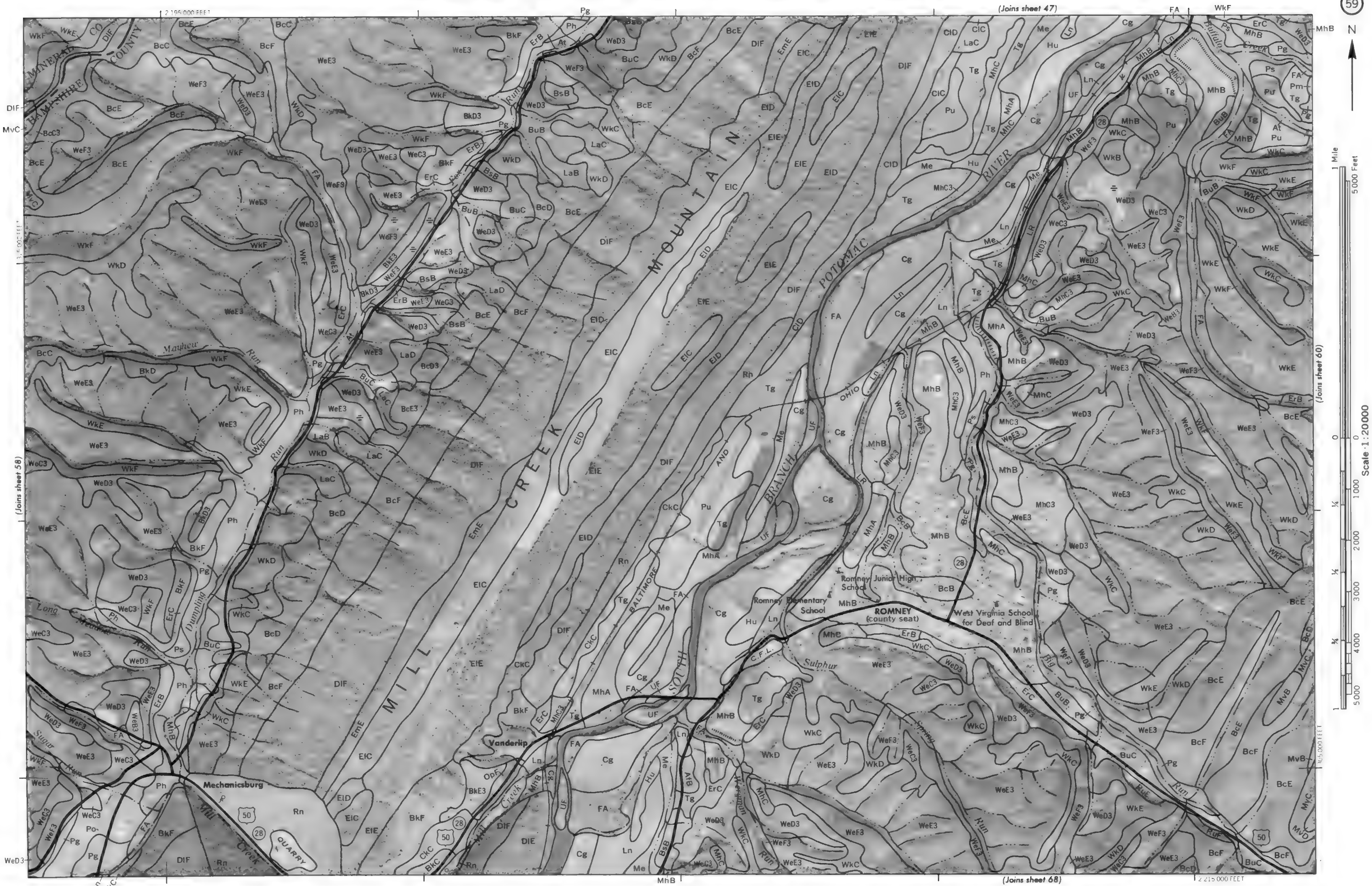
Creek

water

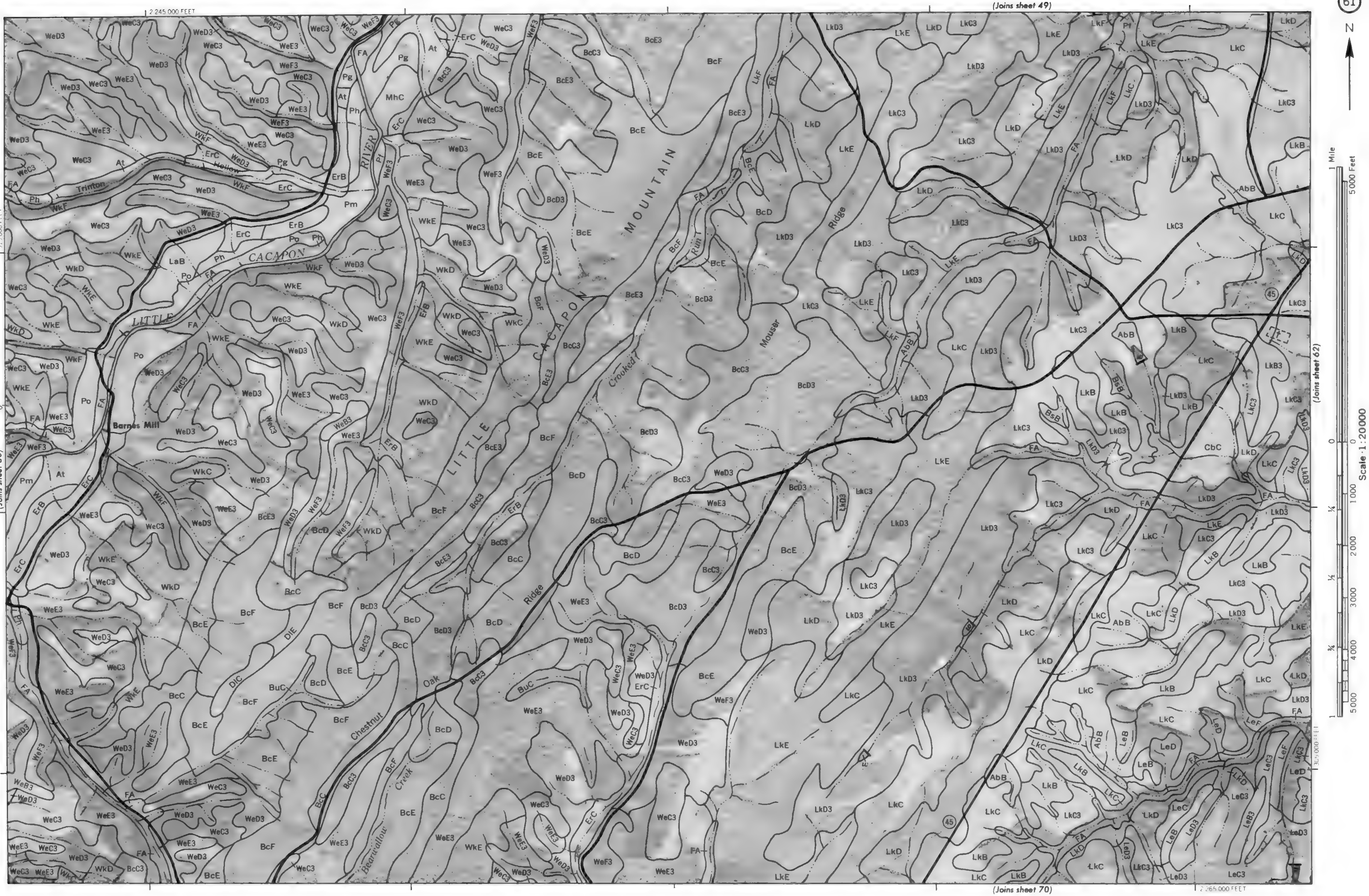
C.F.L.

50
220

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NUMBER 58


(Joins sheet 47)
(Joins sheet 58)
(Joins sheet 60)
(Joins sheet 68)
2 195 000 FEET
2 215 000 FEET
N
1 Mile
5000 Feet
Scale 1:20000
MINERAL CO
HAMPSHIRE COUNTY
MILL CREEK MOUNTAIN
POTOMAC RIVER
SOUTH BRANCH
BALTIMORE AND OHIO
C.F.L.
Mayhew Run
Dumpling Run
Long Meadow Run
Sugar Run
Mill Creek
Sulphur Spring Run
Buffalo Creek
Big Run
ROMNEY (county seat)
Romney Junior High School
Romney Elementary School
West Virginia School for Deaf and Blind
Vanderlip
Mechanicsburg
QUARRY
50
28
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 59


60
N
(Joins sheet 48)
(Joins sheet 59)
(Joins sheet 61)
(Joins sheet 69)
MOUNTAIN
SOUTH BRANCH
TOWN HILL
Buffalo Creek
Trimton Hollow
Shawan Run
CACAPON RIVER
Ebenezer Church
2 240 000 FEET
2 220 000 FEET
1 Mile
5 000 Feet
Scale 1:20000
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 60


61
N
(Joins sheet 49)
(Joins sheet 60)
(Joins sheet 62)
(Joins sheet 70)
2 245 000 FEET
2 265 000 FEET
315 000 FEET
LITTLE CACAPON RIVER
Trimton Hollow
Barnes Mill
MOUNTAIN
LITTLE CACAPON
Crooked Run
Mouser Ridge
Ridge
Chestnut Oak Ridge
Bearwallow Creek
45
1 Mile
5000 Feet
Scale 1:20000

62

N

1 Mile

5,000 Feet

Scale 1:20000

(Joins sheet 50)

(Joins sheet 61)

(Joins sheet 71)

(Joins sheet 63)

2,290,000 FEET

315,000 FEET

2,270,000 FEET

Stanesville

Stanesville Elementary School

Maple Run

Mt Zion Church

Gribbons Run

North River Mills

Raven Rocks

NORTH RIVER

Devils Backbone

NORTH RIVER MOUNTAIN

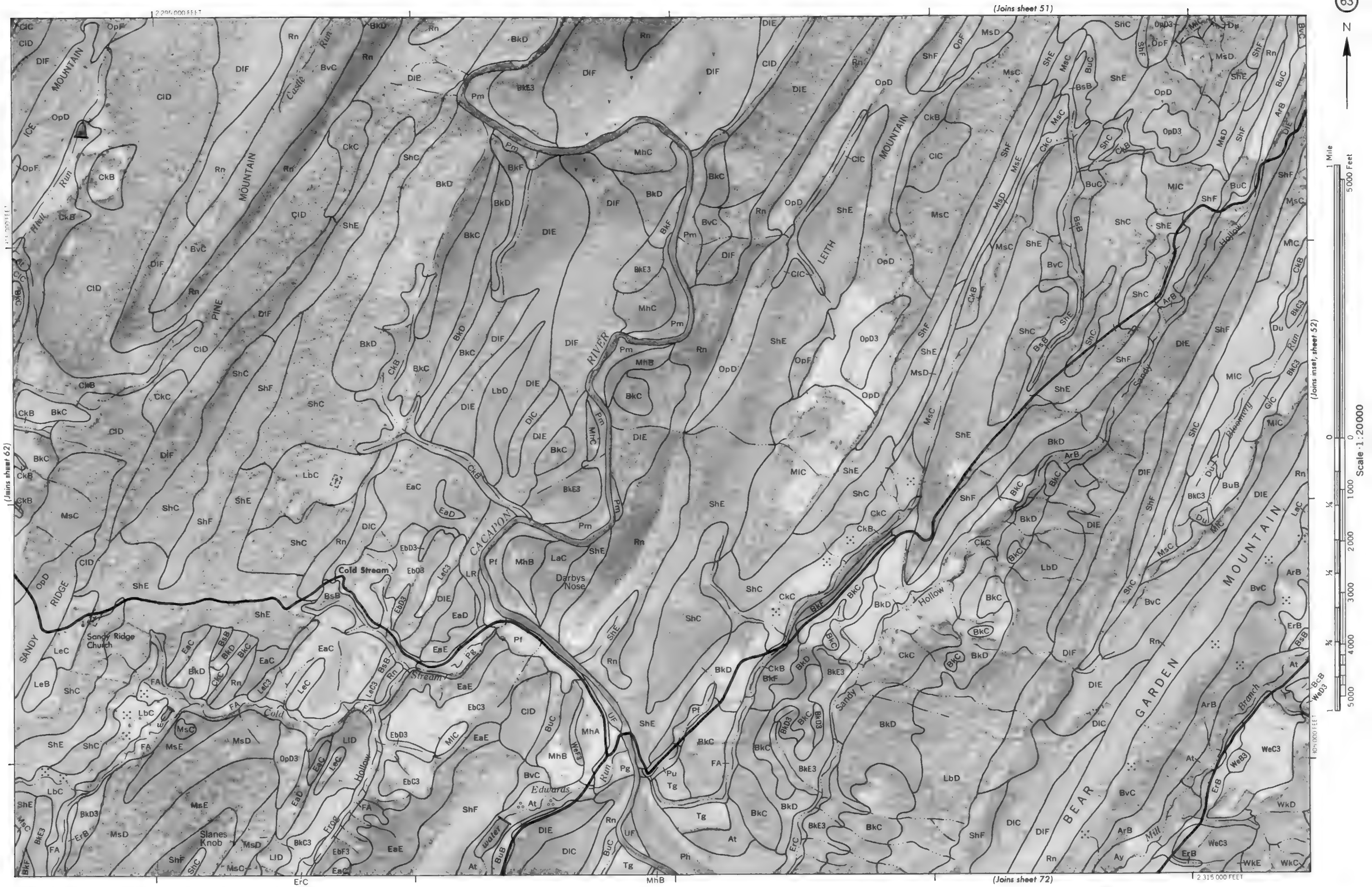
TIMBER RIDGE

SANDY RIDGE

Hiett Run

Biggs Hollow

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 62


63
N
(Joins sheet 51)
(Joins sheet 72)
(Joins sheet 62)
(Joins inset, sheet 52)
2 295 000 FEET
2 315 000 FEET
ICE MOUNTAIN
PINE MOUNTAIN
Castle Run
Hiett Run
CACAPON RIVER
LEITH MOUNTAIN
SANDY RIDGE
Sandy Ridge Church
Cold Stream
Darbys Nose
Frog Hollow
Slanes Knob
Edwards Run
Sandy Hollow
Bloomery Run
BEAR GARDEN MOUNTAIN
Mill Branch
Scale 1:20 000
1 Mile
5000 Feet
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 63

N

Scale 1:20000

1 Mile 5000 Feet

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

(Joins sheet 55)

(Joins inset, sheet 94)

(Joins sheet 65)

2 115 000 FEET

2 095 000 FEET

Hartmansville

Bloke Chapel

Emory Creek

Poking Run

Laurel Dale

ALLEGHENY FRONT

FORE KNOBS

MINERAL COUNTY

GRANT COUNTY

C.F.L.

GlC ErB GlC ArB GlB LbD GmF WoC FA BvC FA GmF GmC GlB GlD LbC LbD CcF DIF BvD DIF LIF LIE LeC BcE

Es At ArB ErC WnC SM TPC 42 50 BcF

BsB GmF GlD ErB ArB GmC GmF BvC

GlC WnB ErB BsB GmF GmC Rn DIE CaD LeD QU. LID LIF BcE BcC BvC

ArB BuB GlB GmF WnC WnB TPC CaD LeD LeE LID BcD BcC

At Pu Es ArB WoC ArB BvC DIF CcF LIE BsB

WnB BuB 50 WnB At At BvC LID BcF BkD BkB BkC

BsB ErB LaC GlC WnB GlB GmC GmC DIF LIE BvC Ps

GmF WnB GlB Rn EaD GlB TPC LID BvD BcF BkC ErB

GlC GlD GlC WnB GmC WnB SM DIF LIF BcC BcD BsB Pm

CcF CaD LID BvC BkC Ln

LIC LIF BuC Ps 93 BuC

DIF LIC BcE BcD BvC DIE

LIF BcF BkC DIC

BcC BvC TPE

BcE BvD

BuD BuC Cg

BvC 93 BvD

LBC TPE Rn

LaD RdD

Rn

• HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA, NO. 65 •

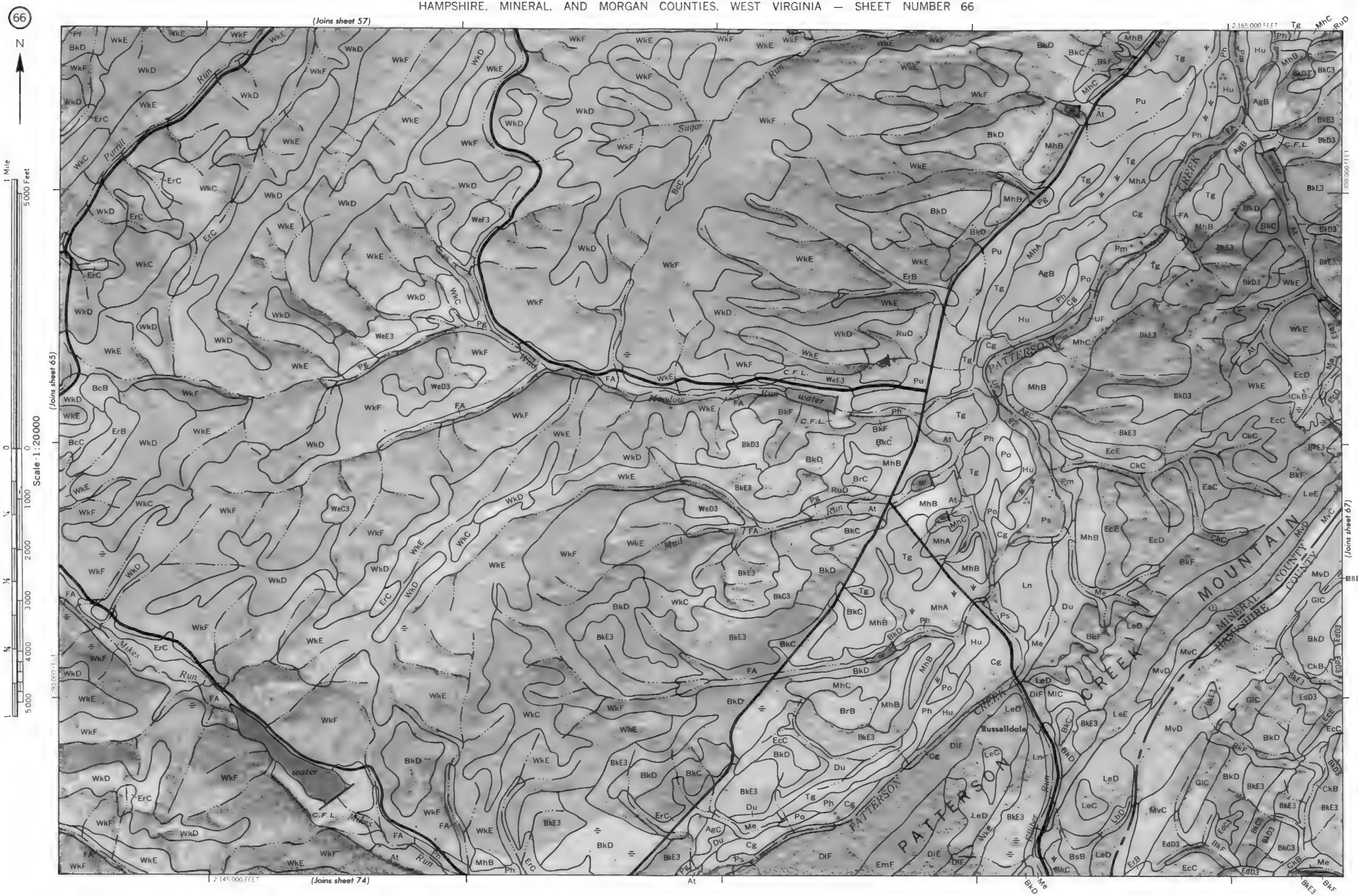
(Joins sheet 56)
(Joins sheet 64)
(Joins sheet 66)
(Joins sheet 73)

65

N

1 Mile
5000 Feet

Scale 1:20000


66
N
(Joins sheet 57)
(Joins sheet 65)
(Joins sheet 67)
(Joins sheet 74)
Scale 1:20000
1 Mile
5000 Feet
Sugar
Run
Mikes
Mud
Meadow
water
C.F.L.
PATTERSON
CREEK
MOUNTAIN
Russelldale
MINERAL COUNTY
HAMPSHIRE COUNTY
2 145 000 FEET
2 165 000 FEET

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — NO. 67

(Joins sheet 58)
(Joins sheet 66)
(Joins sheet 68)
(Joins sheet 75)

68

N

(Joins sheet 59)

(Joins sheet 67)

(Joins sheet 69)

(Joins sheet 76)

MILL CREEK MOUNTAIN

POTOMAC

BALTIMORE AND OHIO RIVER

SOUTH BRANCH MOUNTAIN

SOUTH BRANCH

Mill Creek

Stump Run

Weryman Run

McDowell Run

Dru Run

Core Run

Scale 1:20000

1 Mile 5000 Feet

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 69

70

N

Scale 1:20000

1 Mile 5000 Feet

(Joins sheet 61)

(Joins sheet 69)

(Joins sheet 71)

(Joins sheet 78)

2,265,000 FEET

300,000 FEET

Augusta

Augusta Elem School

Tearcoat Church

Pleasant Dale

Chestnut Oak Ridge

Bragg Run

Tearcoat Run

Turkeyfoot Rim

Dunmore Ridge

Pine Creek

Tear Coat Creek

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NO. 70

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 71

Topography revised from 1954 aerial photography by the U. S. Department of Agriculture Soil Conservation Service and cooperating agencies
Control by U. S. Coast and Geodetic Survey and West Virginia Department of Highways
Coordinate grid ticks and grid values are for Universal Transverse Mercator projection, zone 17

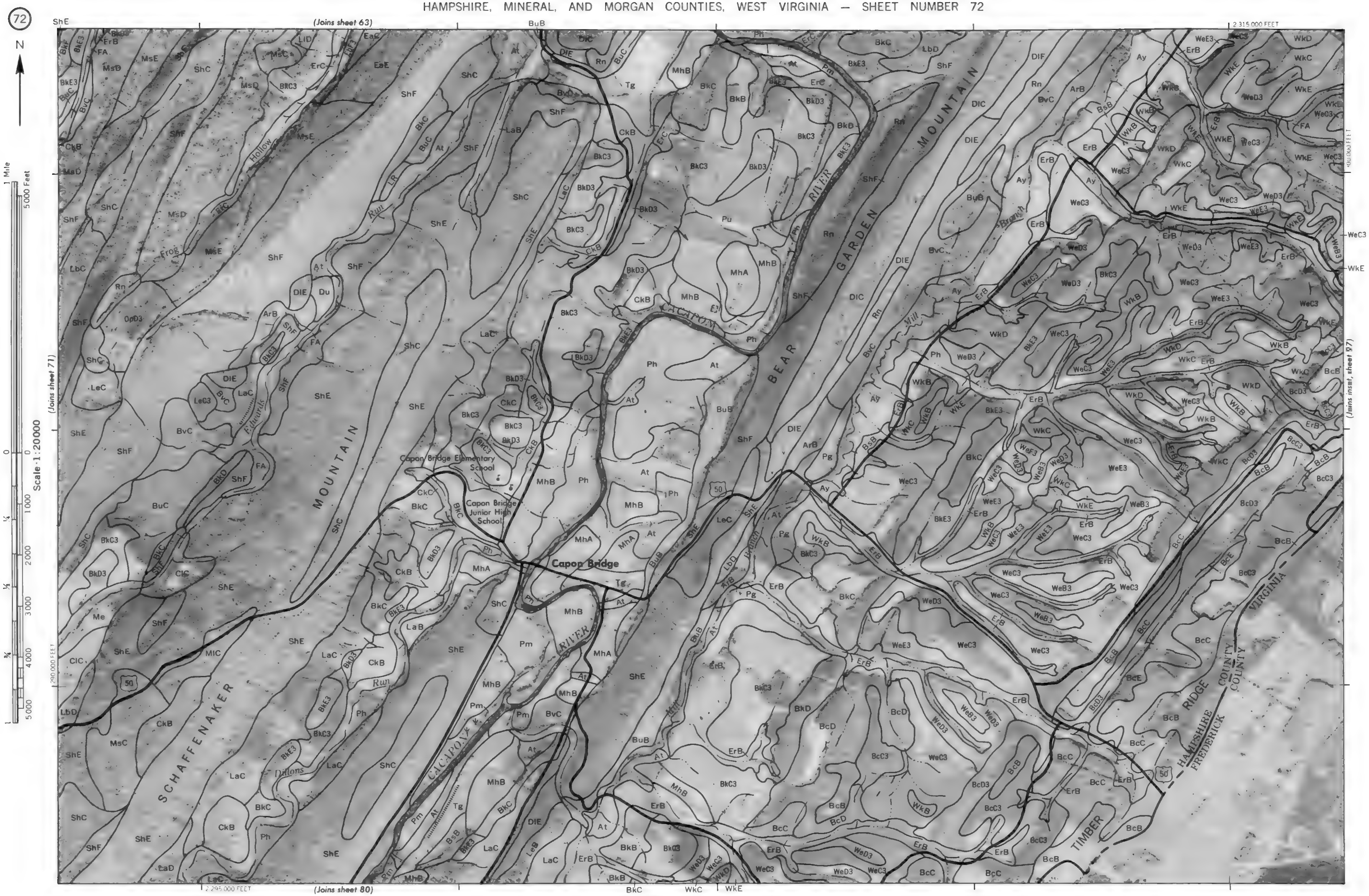
(Joins sheet 62)
(Joins sheet 71)
(Joins sheet 72)
(Joins sheet 79)

2 270 000 FEET
2 290 000 FEET
390 000 FEET
390 000 FEET

71

N

1 Mile
5000 Feet
Scale 1:20000



HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 72

N

(Joins sheet 65)

(Joins sheet 74)

1 Mile

5000 Feet

Scale 1:20000

2 130 000 FEET

2 140 000 FEET

270 000 FEET

TUCKER COUNTY

MINERAL COUNTY

GRANT COUNTY

RIDGE

Run

Pursley Run

Clints Run

Buskirk Run

Tramess Run

Water

CREEK

PATTERSON

LcE ArB ClC BvC EmF EmE DlE DlF EcC ClD BkD3 BkC3 BkE3 Pg WkF WkE ErB FA BcC3 ErC BcD BcE BcC WkD WeD3 WkC WeC3 WeE3 RuF RuD Ps UF BkC Cg BkF ClC Ln

N

(Joins sheet 66)

(Joins sheet 73)

(Joins sheet 75)

(Joins sheet 81)

2 165 000 FEET

2 145 000 FEET

1 Mile

5000 Feet

Scale 1:20000

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

MOUNTAIN

CREEK

PATTERSON CREEK

Run

Dry Run

Purslev Run

Ellis Run

Miller Run

Mill Creek

Fimlick Creek

MINERAL COUNTY

HAMPSHIRE COUNTY

GRANT COUNTY

Rada

Mill Creek Elementary School

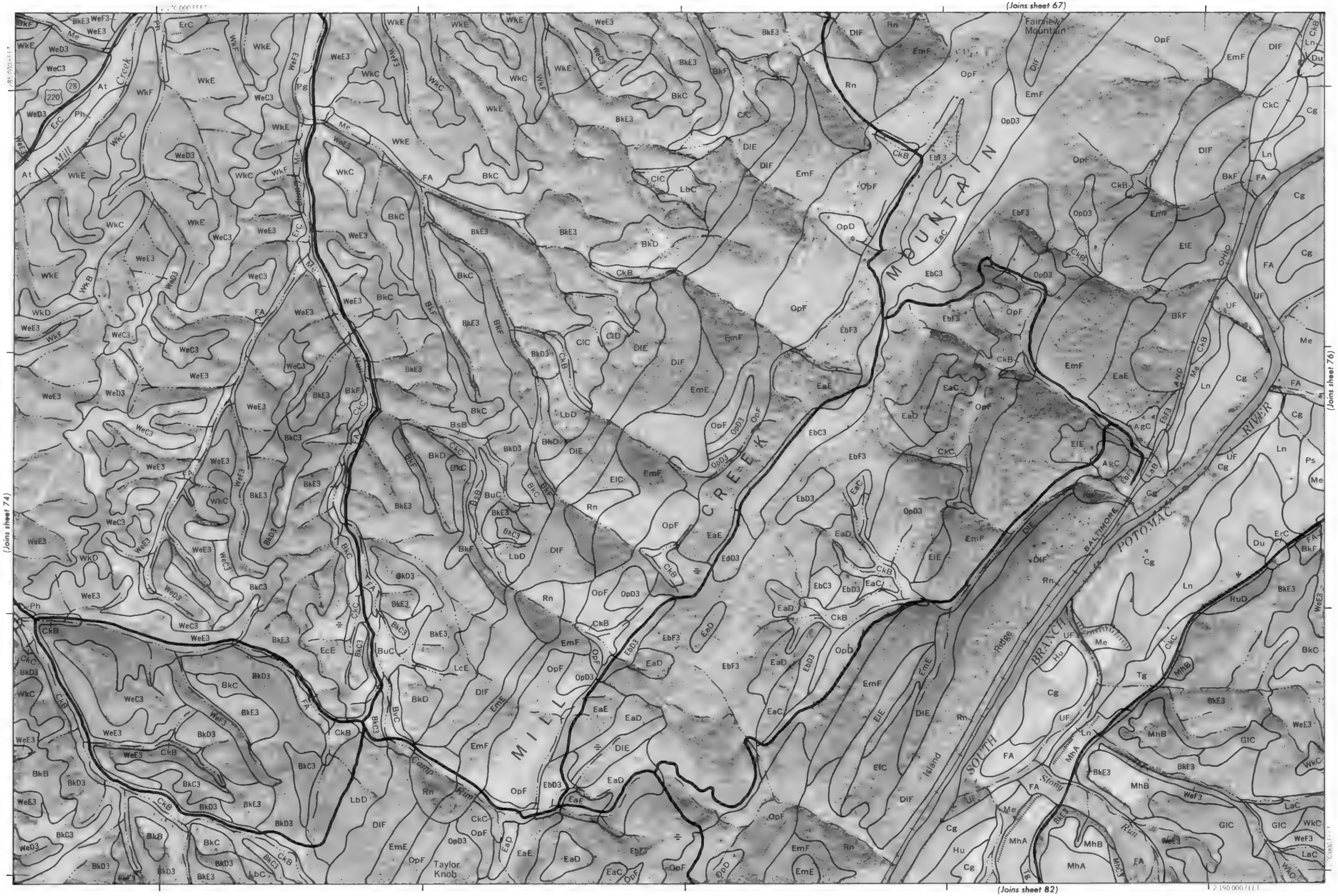
Purgitsville

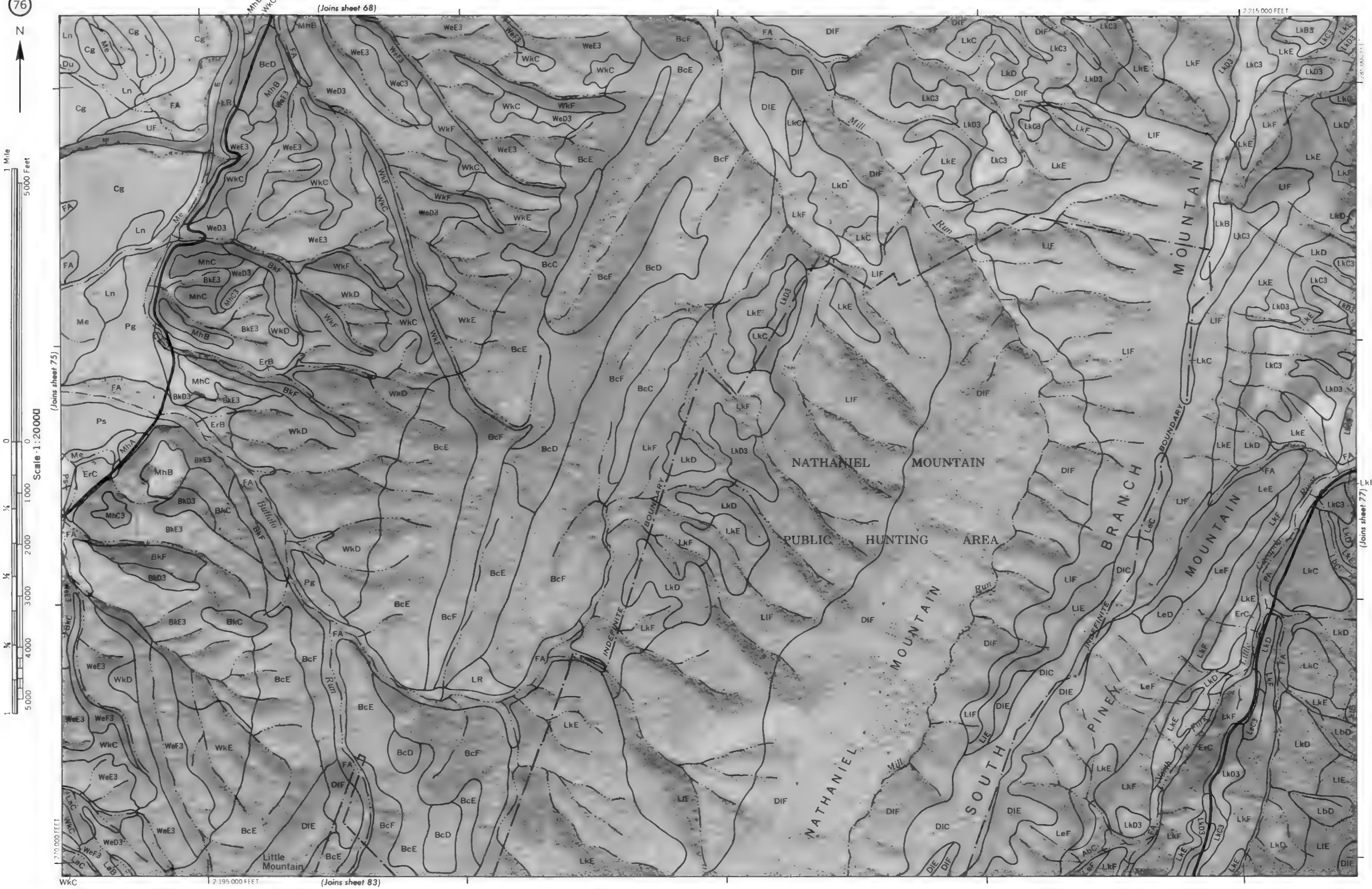
220

28

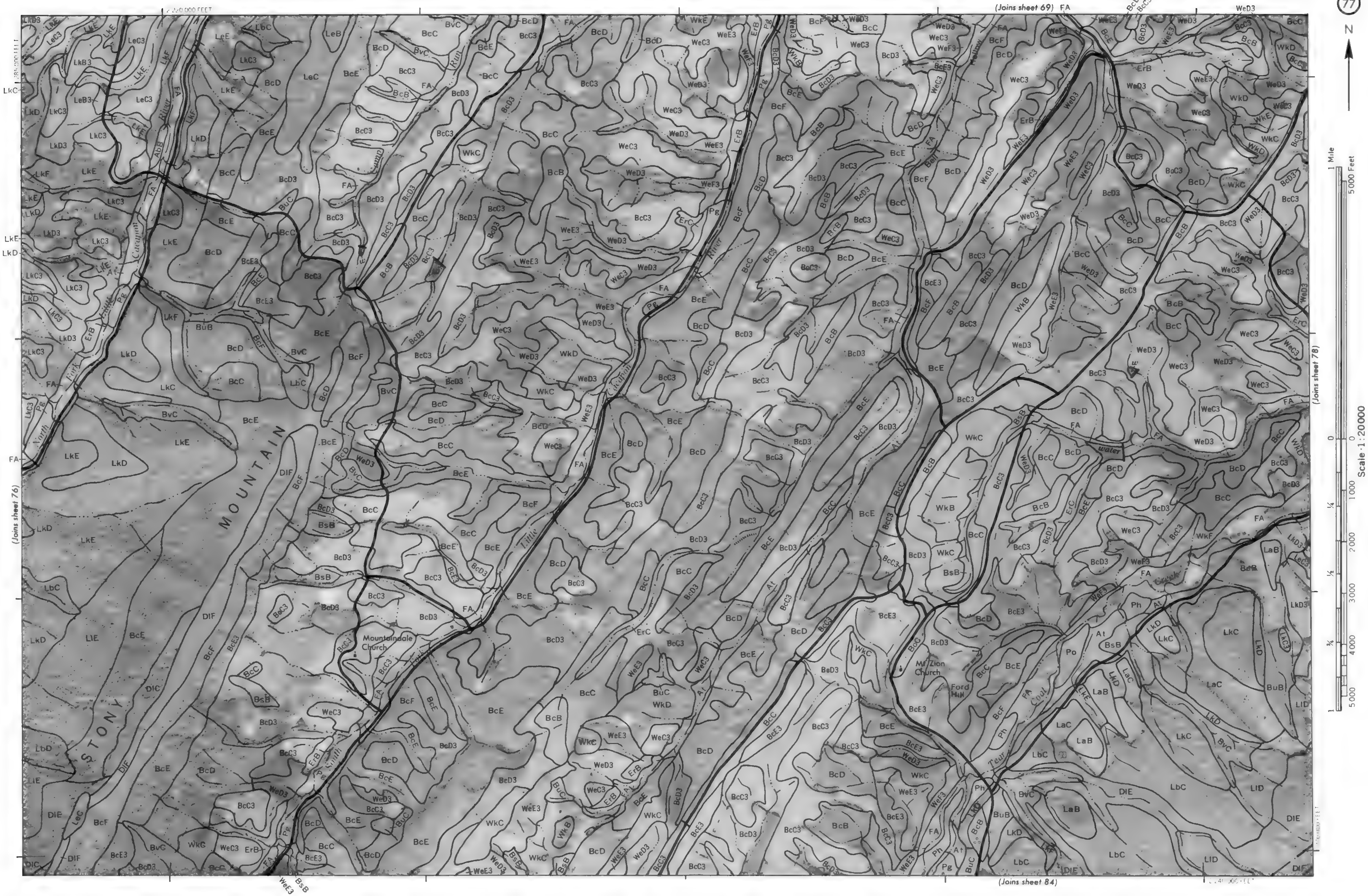
HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 74

MAPS OF COAL-BEARING AREAS IN HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 75





HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 76


77
N
(Joins sheet 69)
(Joins sheet 76)
(Joins sheet 78)
(Joins sheet 84)
STONY
MOUNTAIN
Mountaindale Church
Mt Zion Church
Ford Hill
North Fork
Little Cacapon River
Cacapon River
Little Cacapon
Bell Hollow
Run
Little Cacapon
Tear Coat Creek
water
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1

78

N

(Joins sheet 70)

2,265,000 FEET

1 Mile
5000 Feet
Scale 1:20000
0 0 ¼ ½ ¾ 1
1000 2000 3000 4000 5000

(Joins sheet 77)

(Joins sheet 79)

(Joins sheet 85)

2,245,000 FEET

Creek
Run
Ridge
Pine
Draft
Dunmore
Brushy
Pearl
Coal
Turkeytail
SHORT MOUNTAIN
INDEFINITE PUBLIC HUNTING AREA BOUNDARY
NORTH RIVER MOUNTAIN
RIVER

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NO. 78

MAP SHOWING SOIL TYPES, HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NO. 79

80

N

(Joins sheet 72)

2 315 000 FEET

(Joins sheet 79)

(Joins sheet 87)

2 295 000 Feet

Scale 1:20000

1 Mile 5000 Feet

0 0 ¼ 1000 ½ 2000 ¾ 3000 1 4000 5000

DILLONS MOUNTAIN

CACAPON MOUNTAIN

RIDGE

TIMBER RIDGE

VIRGINIA

HAMPSHIRE COUNTY

FREDERICK COUNTY

Capon Chapel

Hooks Mills

Dillons Run

Old Mans Run

Kale Hollow

CACAPON RIVER

DIF

Department of Agriculture, Soil Conservation Service, in cooperation with the West Virginia Agricultural Experiment Station

SOIL SURVEY MAP — HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NUMBER 80

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NUMBER 81

81

N

2 145 000 FEET

2 165 000 FEET

265 000 FEET

(Joins sheet 74)

(Joins sheet 82)

Purgitsville

Old Pine Church

GRANT CO

MINERAL CO

HAMPSHIRE / HARDY COUNTY COUNTY

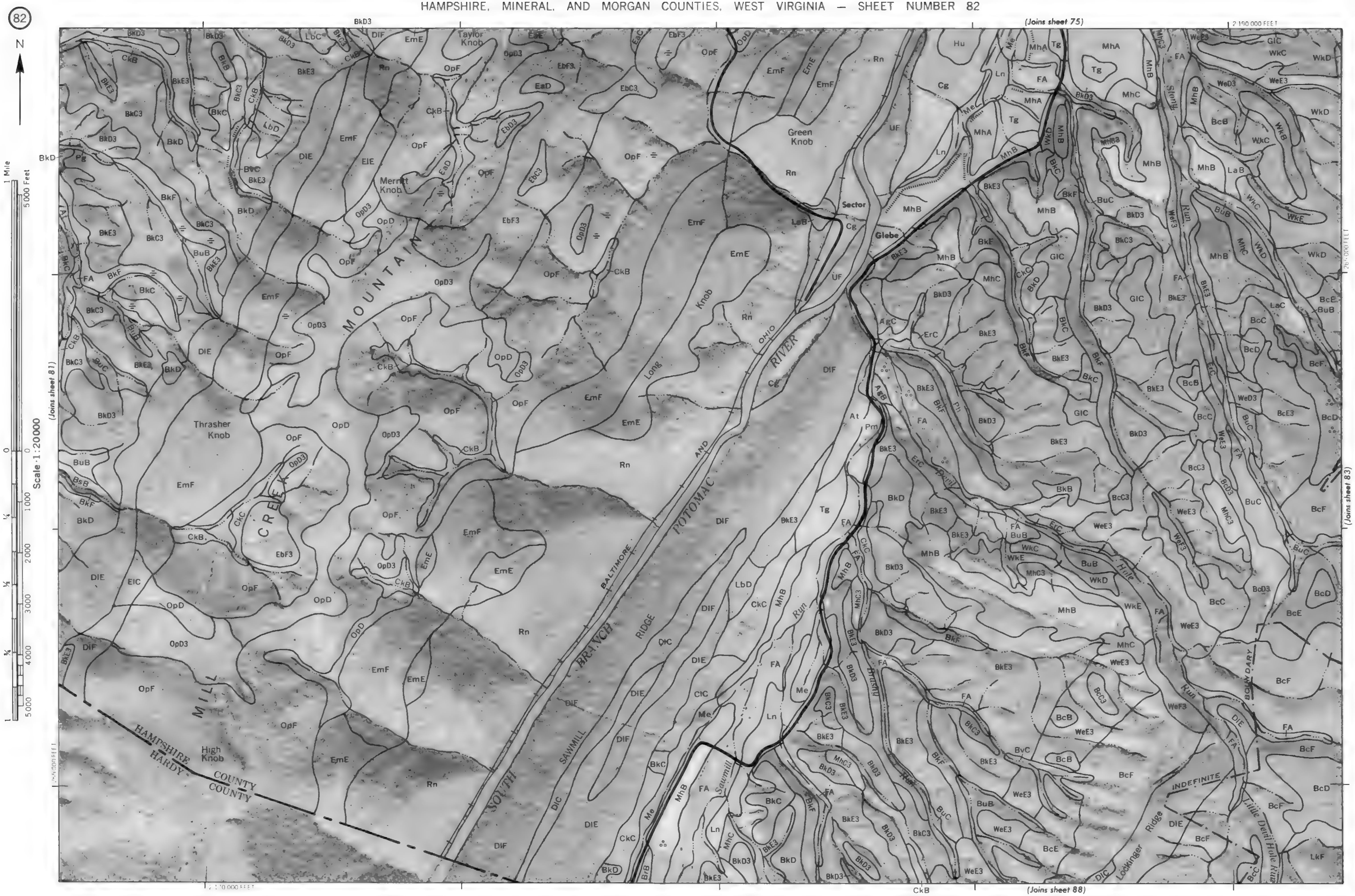
Scale 1:20000

1 Mile

5000 Feet

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 81

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned


82
N
(Joins sheet 75)
(Joins sheet 81)
(Joins sheet 83)
(Joins sheet 88)
2 190 000 FEET
1 Mile
5000 Feet
Scale 1:20000
Taylor Knob
Merritt Knob
Green Knob
Sector
Glebe
MOUNTAIN
Long Knob
Thrasher Knob
CREEK
MILL
High Knob
HAMPSHIRE COUNTY
HARDY COUNTY
SOUTH BRANCH POTOMAC RIVER
BALTIMORE AND OHIO
RIDGE
SAWMILL
Sawmill Run
Run
Stony Run
Devil Hole Run
Little Devil Hole Run
Lockinger Ridge
BOUNDARY
INDEFINITE

N

2,195,000 FEET

(Joins sheet 76)

(Joins sheet 82)

(Joins sheet 84)

(Joins sheet 89)

LITTLE MOUNTAIN

NATHANIEL MOUNTAIN

PUBLIC HUNTING AREA

BRANCH NATHANIEL SOUTH

PINEY MOUNTAIN

BOUNDARY MOUNTAIN

STONY LICK RUN

Bumble Run

Mill Run

Grassy Lick Run

Horn Run

Camp Run

INDEFINITE BOUNDARY

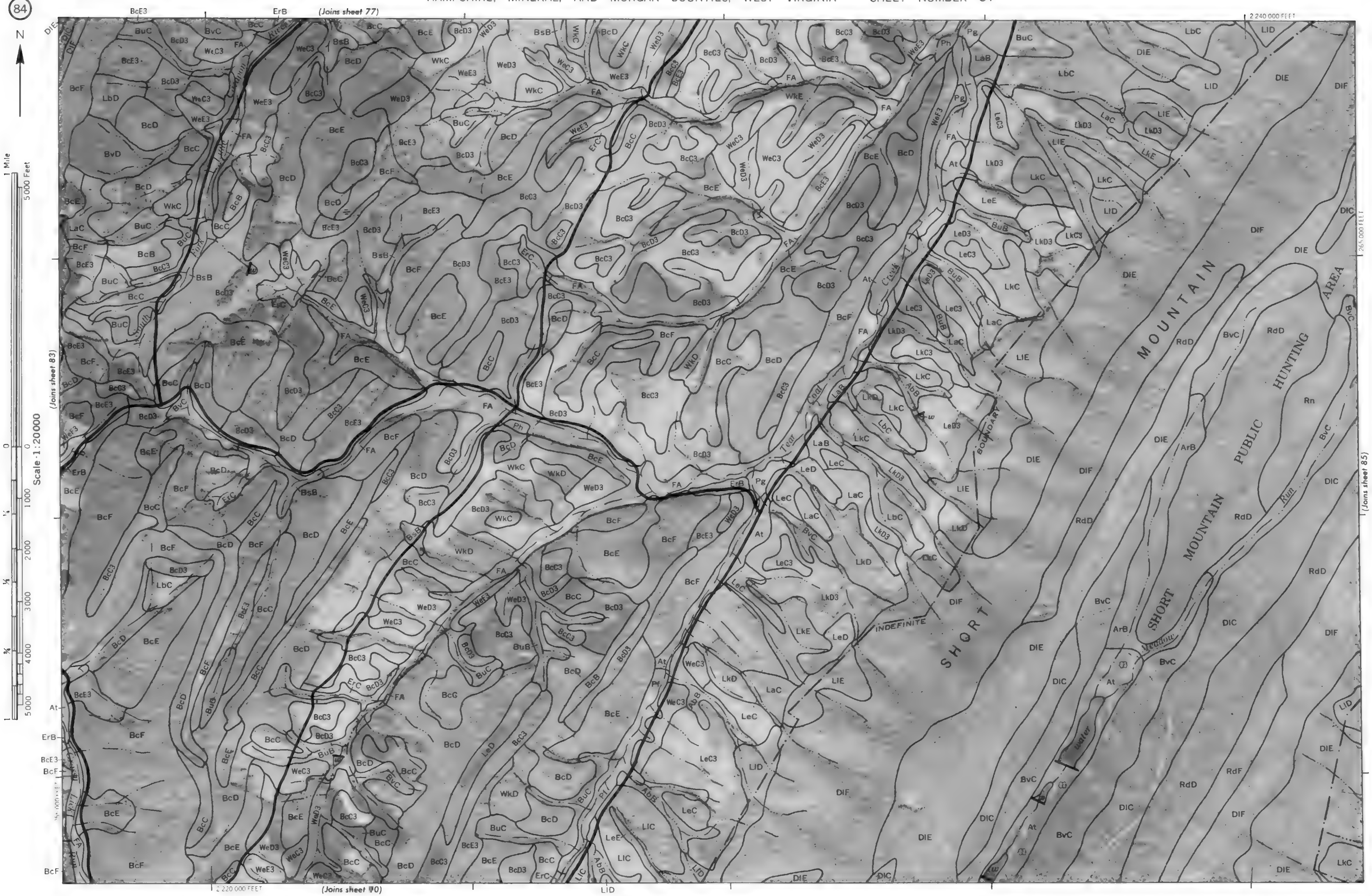
1 Mile

5000 Feet

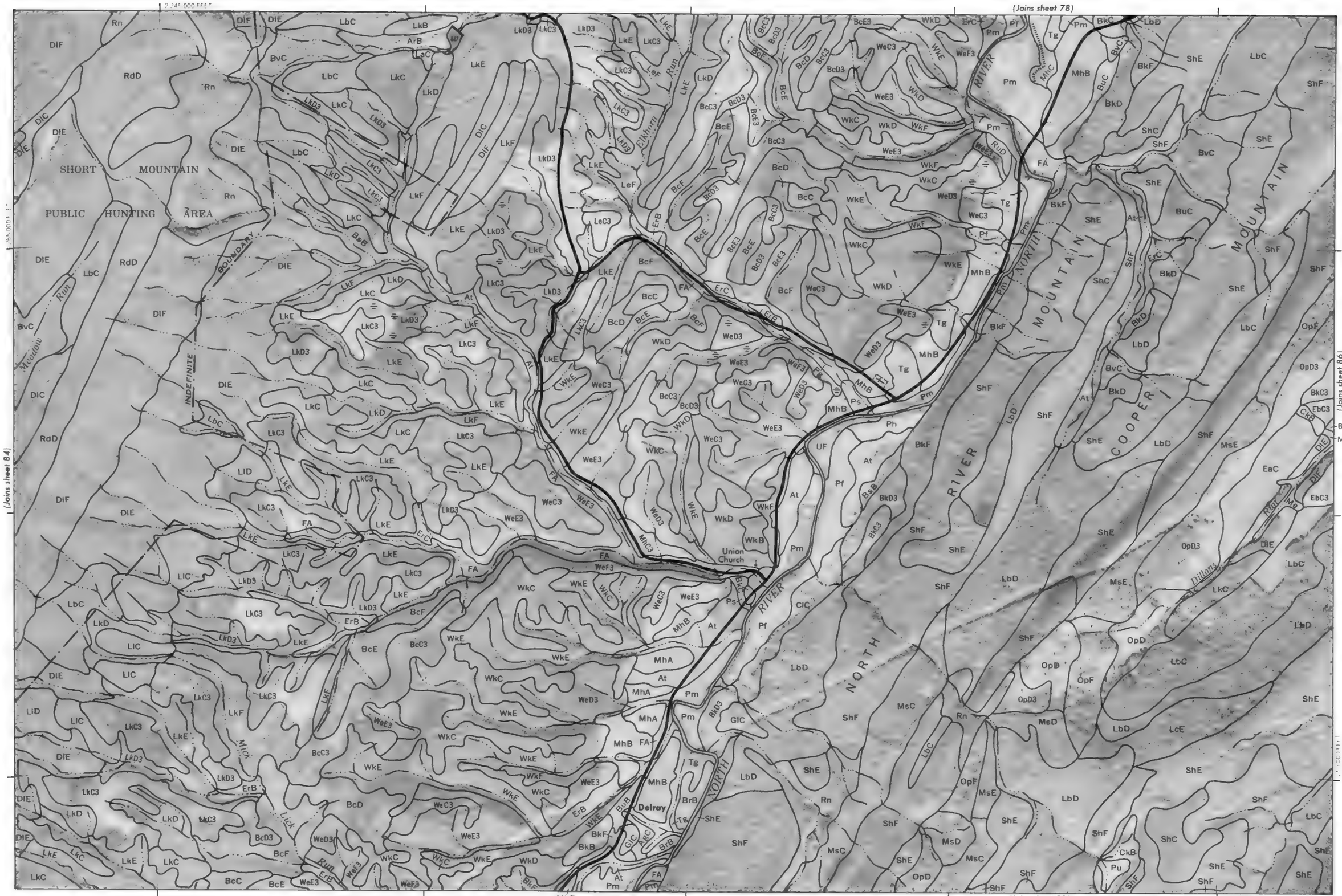
Scale 1:20000

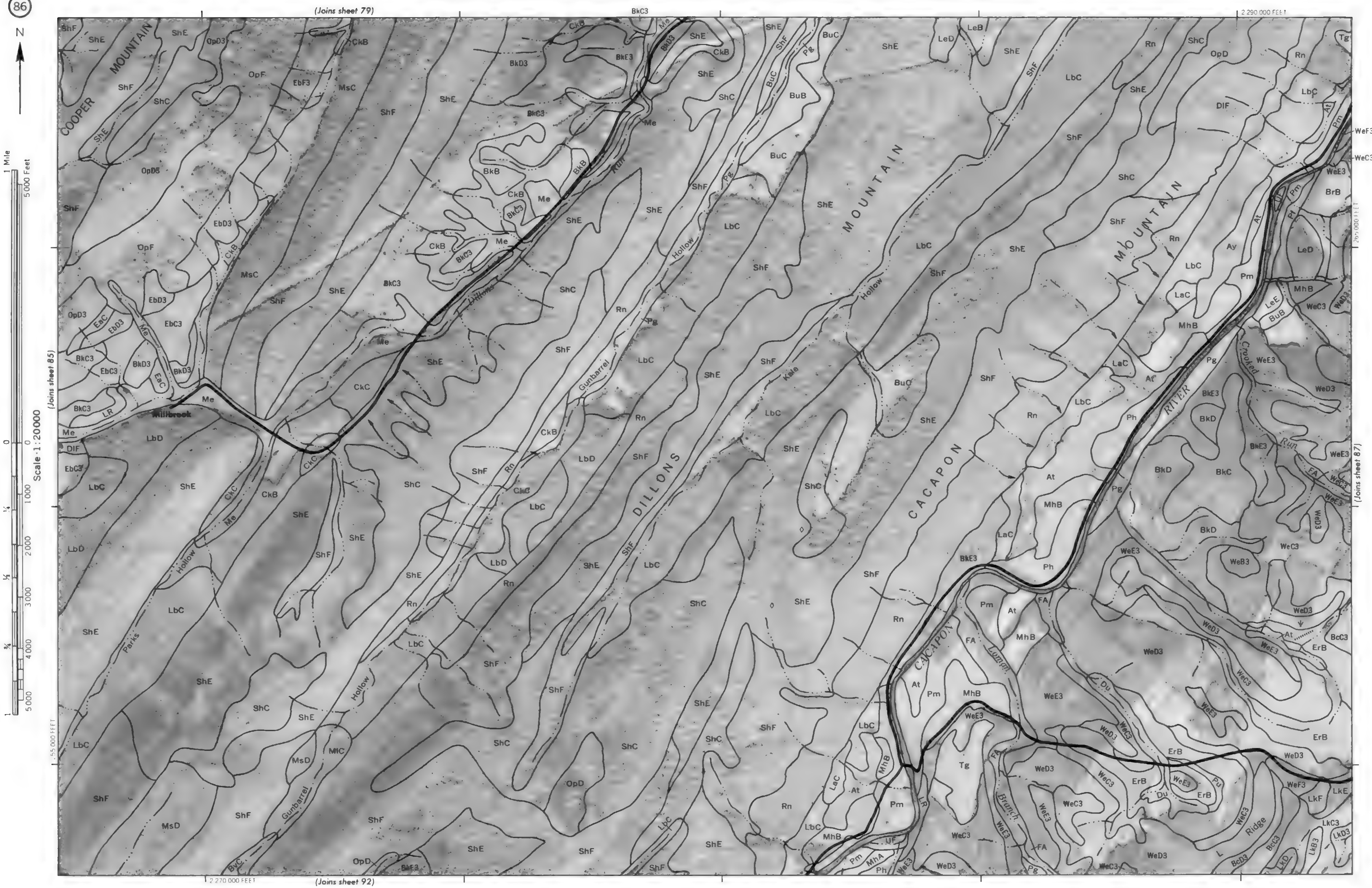
MAP OF HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 83

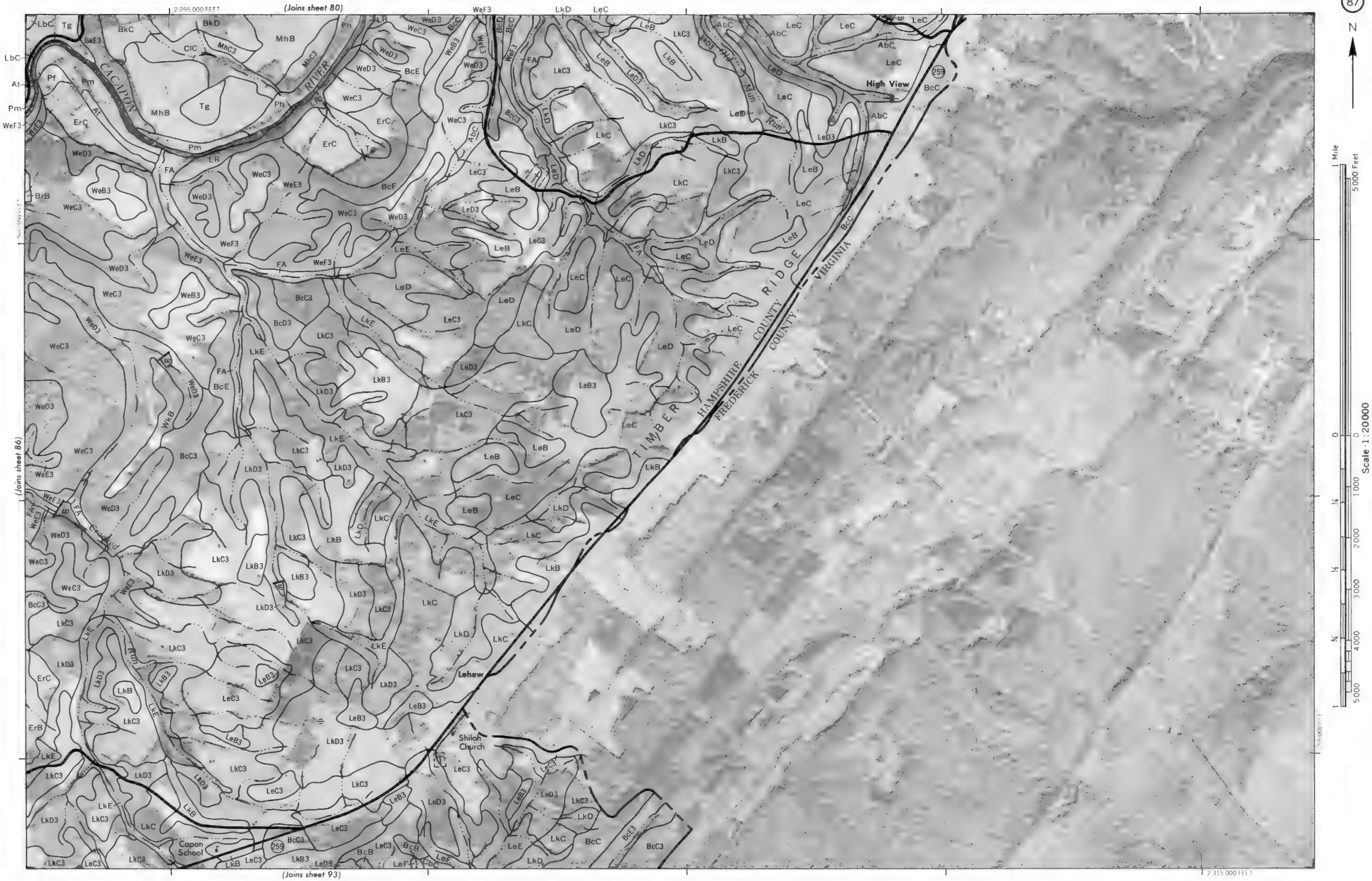
This map is compiled on 1934 aerial photographs by the U. S. Department of Agriculture, soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately plotted


84
N
(Joins sheet 77)
(Joins sheet 83)
(Joins sheet 85)
(Joins sheet 90)
1 Mile
5000 Feet
Scale 1:20000
2 240 000 FEET
265 000 FEET
2 220 000 FEET
SHORT MOUNTAIN PUBLIC HUNTING AREA
SHORT MOUNTAIN
BOUNDARY
INDEFINITE
Tear Coat Creek
Meadow Run
Run
South Fork
water

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NUMBER 85




86
N
(Joins sheet 79)
(Joins sheet 85)
(Joins sheet 87)
(Joins sheet 92)
COOPER MOUNTAIN
DILLONS MOUNTAIN
CACAPON MOUNTAIN
CACAPON RIVER
Millbrook
Dillons Run
Gunbarrel Hollow
Kale Hollow
Parks Hollow
Crooked Run
Ridge
Scale 1:20000
1 Mile
5000 Feet
2 290 000 FEET
2 270 000 FEET



HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 87


88
N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
(Joins sheet 82)
(Joins sheet 89)
(Joins sheet 5)
(Joins sheet 10)
2 190 000 FEET
2 315 000 FEET
2 300 000 FEET
2 170 000 FEET
410 000 FEET
405 000 FEET
240 000 FEET
250 000 FEET
HAMPSHIRE
HARDY
COUNTY
COUNTY
Brushy Run
Sawmill Run
Ridge
Lockinger
INDEFINITE
BOUNDARY
Little Devil Hole Run
ALLEGANY COUNTY
MORGAN COUNTY
MARYLAND
WESTERN
MARYLAND
POTOMAC RIVER
POTOMAC RIVER
Orleans Cross Roads
B AND O
Doe Gully
BALTIMORE
AND
OHIO
Hollow
Beanpatch
Macks Hollow


89
N
(Joins sheet 83)
(Joins sheet 88)
(Joins sheet 90)
2 195 000 FEET
2 215 000 FEET
NATHANIEL MOUNTAIN PUBLIC HUNTING AREA
NATHANIEL MOUNTAIN
SOUTH BRANCH MOUNTAIN
INDEFINITE BOUNDARY
HAMPSHIRE COUNTY
HARDY COUNTY
Horn Camp Run
Lick Run
1 Mile
5000 Feet
Scale 1:20000

90

N

1 Mile

5000 Feet

Scale 1:20000

(Joins sheet 84)

(Joins sheet 89)

(Joins sheet 91)

(Joins sheet 94)

2 240 000 FEET

2 220 000 FEET

MOUNTAIN

SHORT MOUNTAIN

PUBLIC HUNTING AREA

SHORT MOUNTAIN

BOUNDARY

INDEFINITE BOUNDARY

HAMPSHIRE COUNTY

HARDY COUNTY

NORTH RIVER

Lick Run

Meadow Run

Deep Run

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — SHEET NUMBER 90

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA — NO. 91

91

N

1 Mile

5000 Feet

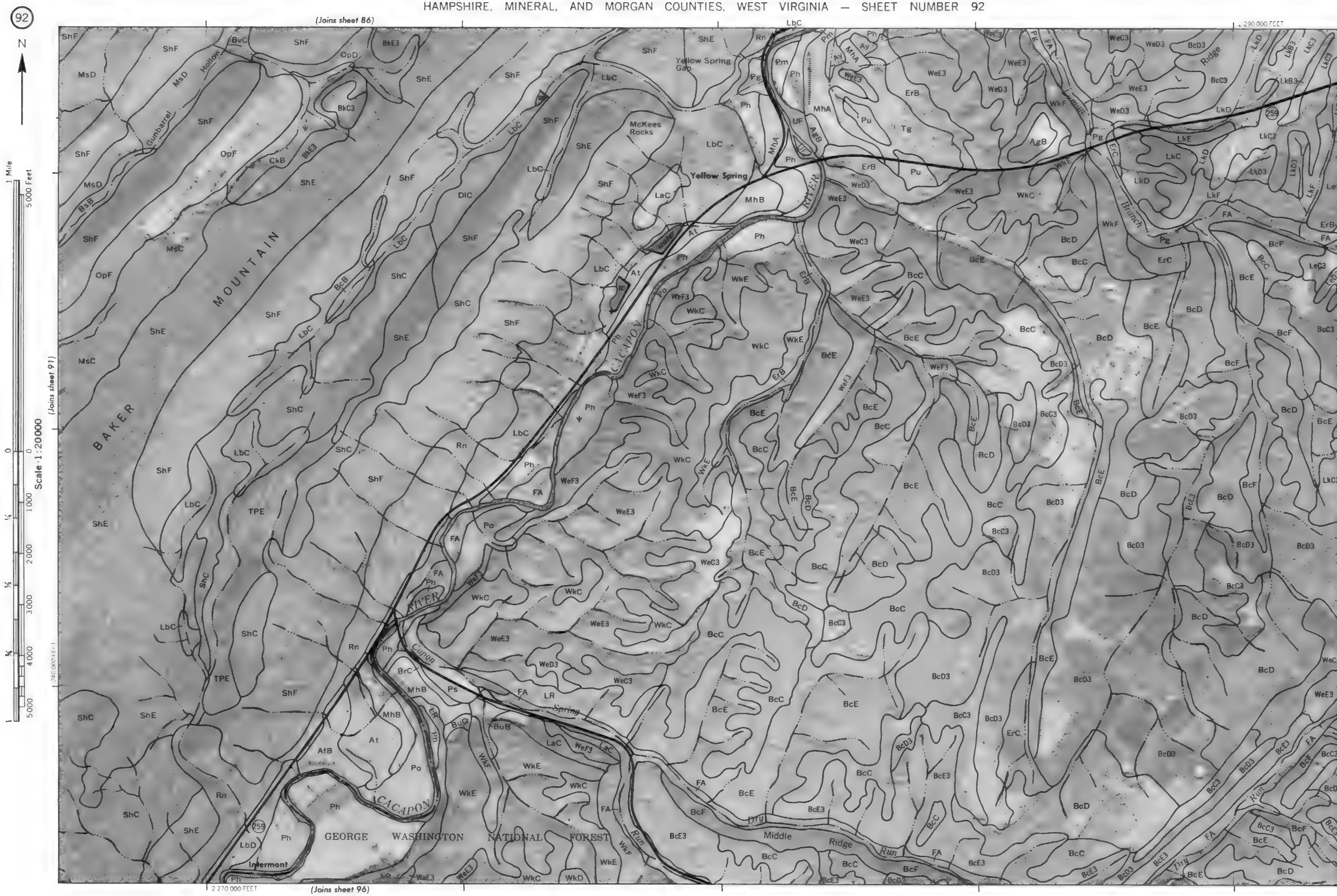
Scale 1:20000

(Joins sheet 85)
(Joins sheet 90)
(Joins sheet 92)
(Joins sheet 95)

2 245 000 FEET

MOUNTAIN RIVER NORTH RIVER MOUNTAIN COOPER MOUNTAIN BAKER MOUNTAIN

Mick Lick Run Deer Run Gunbarrel Hollow Flat Ridge Dutch Hollow Run Moores Run



This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Land name grid ticks and land division corners, if shown, are approximately positioned.

N

2,295,000 FEET

(Joins sheet 87)

250,000 FEET

(Joins sheet 92)

(Joins sheet 97)

2,305,000 FEET

259

Lomont Branch

Pinnacle

GREAT NORTH MOUNTAIN

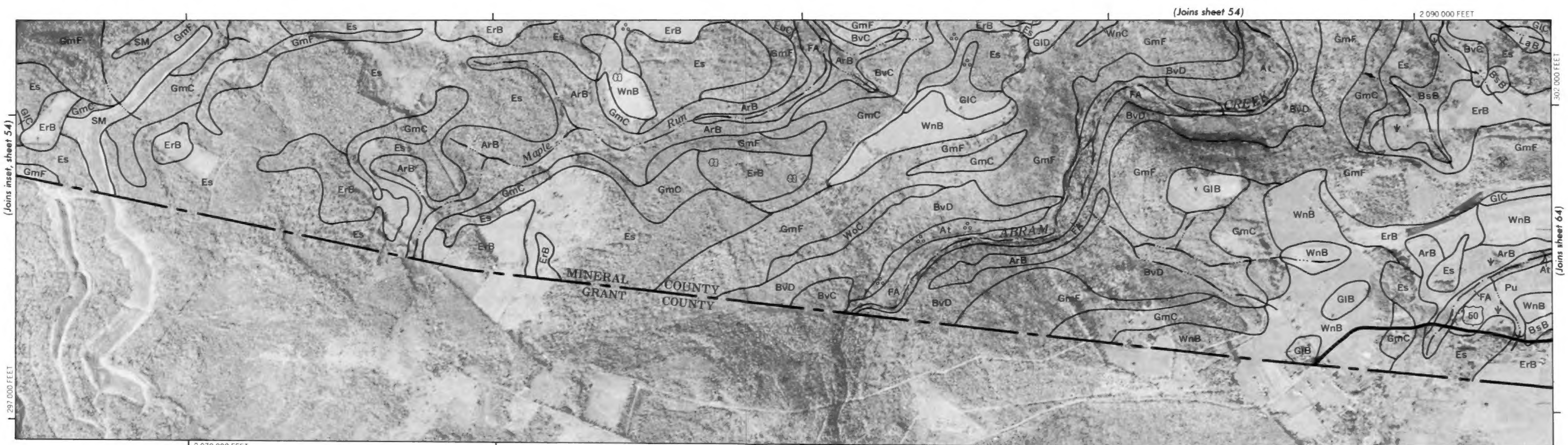
HAMPSHIRE COUNTY VIRGINIA

FREDERICK COUNTY

1 Mile

5000 Feet

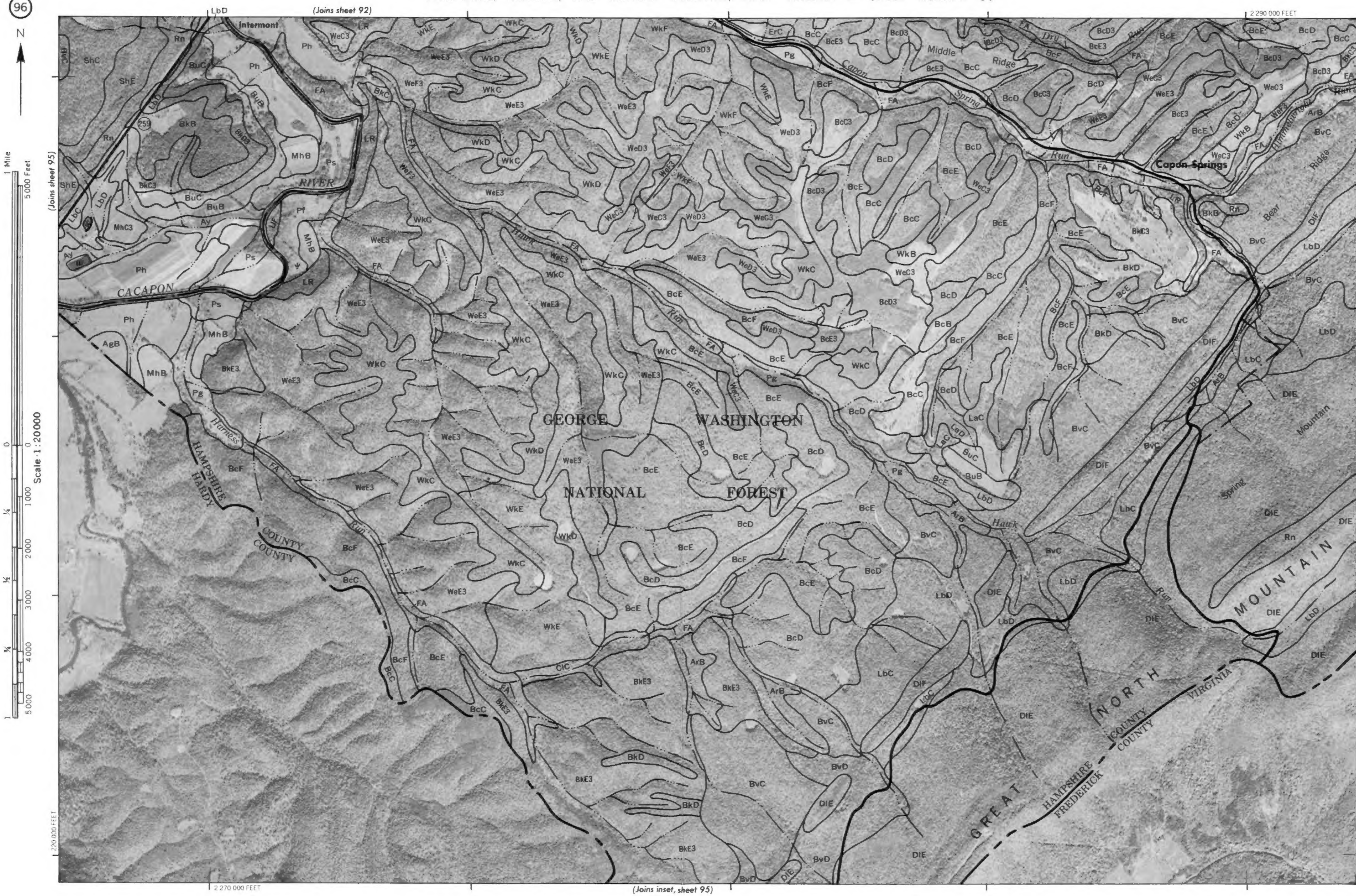
Scale 1:20000



This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 95

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO. 96

HAMPSHIRE, MINERAL, AND MORGAN COUNTIES, WEST VIRGINIA NO 97

This map is compiled on 1974 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.